HELSINKI UNIVERSITY OF TECHNOLOGY
Department of Electrical and Communications Engineering

Timo Sorri

Operating logics of virtual network operators – understanding the companies entering the virtual operator market

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Supervisor : Paul Lillrank, Professor

Instructor : Harry Järn, Master of Science

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The beginning of 21st century has brought along many changes to still quite immature industry of mobile communications. Rapid development of wireless technologies combined with rapid changes in competitive and regulatory environment are causing a disruption in the evolution of the industry. How does this disruption affect the operational model of mobile operators and earnings logic, is a question closely related to ongoing change in the industry. What is the role of one of the latest development, virtual network operators, amidst this development is another relevant question concerning the development of the industry.

This study presents centric theoretical concepts related to value creation of a company, collaborative company networks and how companies and industries evolve. The main factors of disruption, technological and regulatory change, are presented and their effect on the mobile communication value chain is reflected against theories concerning value chain integration.

From evolutionary theories disruptive innovation theory is used as primary framework to ponder hitherto performance of virtual network operators and to make conclusions on the future.The study also scrutinizes what has been identified as possible revenue generators of future virtual network operators in contemporary research of mobile communications. From those ingredients a conceptual framework is developed in order to study performance of two companies from Finnish mobile communication market. An additional company case from British market is presented in order to show the advantages of horizontal operating mode in mobile communication market.

The thesis concludes that the industry in the EU area in general is on verge of horizontalization and mobile network operators are suffering from bureaucratic inefficiency. Although virtual network operator's business model would seem more suitable for future mobile communication markets, they have not yet tapped the full potential of horizontal operating mode. This can be explained with the theory of innovation.

Keywords:
Disruptive innovation, sustaining innovation, industry evolution, vertical integration, horizontal, horizontalization, business model, virtual network operator, MVNO, mobile operator

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2000-luvun alku on tuonut tullessaan monia muutoksia vielä melko kehittymättömään mobiilikommunikaatioteollisuuteen. Langattomien teknologioiden nopea kehitys yhdistettynä nopeaan muutokseen sekä kilpailu- että sääntely-ympäristössä ovat aiheuttamassa epäjatkuvuuden teollisuuden kehityksessä. Miten tämä epäjatkuvuus vaikuttaa mobiilioperaattoreiden toimintamalleihin ja ansaintalogiikkaan, on kysymys, joka liittyy läheisesti käynnissäolevaan muutokseen. Mikä on teollisuuden uusimman kehityssuunnan, virtuaalimobiilioperaattoreiden, rooli tämän kehityksen keskellä on toinen relevantti kysymys koskien teollisuuden kehitystä.

Tämä tutkimus esittää keskeisiä teorioita koskien yrityksen arvonluomisen prosessia, yhteistoiminnallisia yritysverkostoja ja sitä miten yritykset ja teollisuudenalat kehittyvät. Mobiiliteollisuuden epäjatkuvuuden keskeisimmät tekijät, teknologinen ja sääntelyllinen muutos, esitellään ja niiden vaikutusta mobiilikommunikaation arvoketjuun pohditaan käyttäen hyväksi arvoketjuintegraatiota koskevaa teoriaa.

Kehitysteorioista käänteentekevän innovaation teoriaa käytetään pääasiallisena teoriana selittämään virtuaalioperaattoreiden tähänastista kehitystä ja tekemään päätelmiä tulevasta. Tutkimus erittelee myös sitä, mitä tämänhetkinen mobiilikommunikaatiotutkimus on identifioinut mahdollisiksi tulevaisuuden virtuaalioperaattoreiden tulonlähteiksi. Näistä aineksista kehitetään käsitteelinen viitekehys, jonka avulla tutkitaan kahden yrityksen menestystä suomalaisella mobiilikommunikaatiomarkkinalla. Lisäksi esitellään täydentävä yrityscase brittiläiseltä markkinalta, jotta voidaan osoittaa horisontaalisen toimintamallin edut mobiilikommunikaatiomarkkinalla.

Päätelmissä todetaan, että mobiilikommunikaatioteollisuus on horisontalisoitumassa EU:n alueella mistä johtuu, että mobiiliverkko-operaattorit kärsivät tällä hetkellä byrokraattisesta tehottomuudesta. Vaikka virtuaalioperaattorin liiketoimintamalli vaikuttaisi soveliaammalta tulevaisuuden mobiilikommunikaatiomarkkinoilla, ne eivät toistaiseksi ole pystyneet hyödyntämään horisontaalisen toimintamallin täyttä potentiaalia. Tämä voidaan selittää innovaatioteorialla.

Avainsanat: Käänteentekevä innovaatio, ylläpitävä innovaatio, teollisuuden evoluutio, vertikaalinen integraatio, horisontaalinen, horisontalisaatio, liiketoimintamalli, virtuaalioperaattori, mobiilioperaattori

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"Don't let it bring you down, it's only castles burning,
find someone who's turning, and you will come around" – Neil Young

In Espoo, July 2006

Timo Sorri

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Glossary

ARPU	Average Revenue Per User/Subscriber
CCPU	Cash Cost Per User: unit cost of maintaining a mobile subscriber
CDMA	Code Division Multiple Access: Form of digital transmission technique in which a terminal device is allocated a unique code to distinguish the device from others in the area of the base station
CDMA EV-DO 1X	CDMA Evolution Data Only/Optimized,
CDMA EV-DO 1X rev. A	Latest revision of EV-DO: Supports downlink data rates up to 3.1 Mbit/s and uplink data rates up to 1.8 Mbit/s
Churn rate	The proportion of clients leaving supplier or service provider during a given period of time
CPGA	Cost Per Gross Acquisition
EBITDA	Earnings before taxes, interests, depreciations and amortizations. EBITDA can be used to analyse the profitability between companies and industries, because it eliminates the effects of financing and accounting decisions.
EU	European Union
GSM	Global System for Mobile Communications: European digital system for mobile communications
HSDPA	High Speed Downlink Packet Access: an evolution of the WCDMA standard, designed to increase the available data rate by a factor of 5 or more
ITU	International telecommunication union
MMS	Multimedia Messaging Service
MNO	Mobile Network Operator
MVNE	Mobile Virtual Network Enabler
MVNO	Mobile Virtual Network Operator
NO	Network Operator
PC	Personal Computer
PDA	Personal Digital Assistant: A digital device which can include the functionality of a computer, a cellphone, a music player and a camera
SMS	Short Messaging Service
UMA	Unlicensed Mobile Access: Allows seamless roaming between WiFi, Blutetooth and GSM/GPRS networks

UMTS	Universal Mobile Telecommunications System: European 3rd generation mobile communication system based on WCDMA and standardised by ETSI.
VoWLAN	Voice over Internet Protocol using Wireless Local Area Network
VoIP	Voice over Internet Protocol, the routing of voice conversations over Internet or any IP-based network
WCDMA	Wideband Code Division Multiple Access: third generation cellular network technology that enables high speed data to terminal devices
WiBro	Wireless Broadband: WiMAX version developed by the Korean telecoms industry
Wi-Fi	Wireless Fidelity: Refers to a family of wireless broadband technologies that comply with IEEE 802.11 specifications
WLAN	Wireless Local Area Network
WiMAX	Worldwide Interoperability for Microwave Access: A certification mark for products that pass conformity and interoperability tests for the IEEE 802.16 standards. WiMAX is a standards-based wireless technology that provides high-throughput broadband connections over long distance

1. INTRODUCTION

1.1 Motivation

Under the last fifteen years a revolution has happened in the structures of telecommunication industry. Mobile telephony has gradually taken over fixed line telephony; in developed countries mobile phone penetration has surpassed fixed line penetration and in developing countries first telephone calls ever are made with mobile phone.

"The revolution eats its own children". Just when you thought that the dust has settled after the migration from fixed telephony to mobile, another major shakeout has appeared. Deregulation of mobile communication industry has increased competition in many of the mature markets around Europe, which in some markets has stopped the growth of mobile network operator revenue as a major part of revenue has come from mobile voice calls.

At the same time, continuous development of wireless technology is enabling ever-increasing bitrates for different terminal equipment: PC, PDA and mobile terminals. Internet has become increasingly responsible for utilization of fixed line data networks; Internet Protocol is continuing its triumph in data networks and will affect the nature of mobile communications as well. Increased competition in mobile communication market combined with the rapid development wireless access technologies and Voice over IP communications is deflating the status and value of mobile voice.

In mobile communications this has set going a shift from voice-centric delivery business to content- and multimedia-centric service business. As Figure 1 shows, mobile data is forecast to experience a compound average growth rate of 23 % and to almost triple its value 2004-2009. Most of the growth in mobile voice will come from the emerging markets in developing countries. All this will have implications on mobile operator's business models as well.

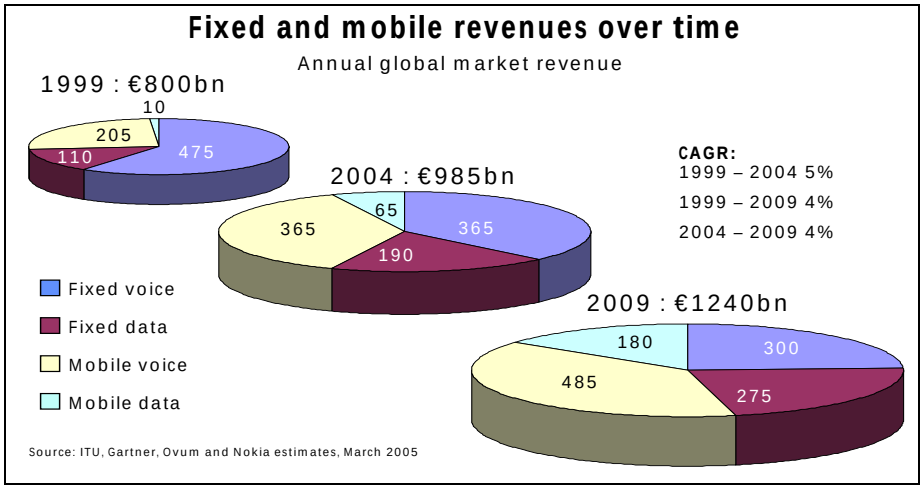


Figure 1 Global mobile services forecast 2005-2009[1].

Mobile virtual network operator (MVNO) refers to a mobile service operator, which does not have own licensed spectrum or network. Instead, it buys mobile capacity from network providers and signs up users under its own brand. When Virgin Mobile became the world's first high profile MVNO in 1999, there were great expectations that it would change mobile communication landscape gradually. Revolution did not happen. Until now most of the MVNOs have been offering rebranded, low cost host network services.

Now seven years later, the transition from voice-centric to content-centric in mobile communication has created a disruption in the development and structures of the industry, and many of the established mobile network operators are confused amidst the development. Meanwhile, content and service owners are now looking for new collaborative ways to enter the mobile market and mobile virtual network operators have become one area of interest for them.

Consequently the discussion around MVNOs is active again. Are MVNOs the catalyst of next stage of mobile communications? Is there a business case for MVNOs? What companies might be interested in utilizing the MVNO business model? Those are some of the questions that this study addresses.

[1] Nokia 2005

1.2 Objectives and scope

The fundamental research question of this thesis work is:

"How does the transition in mobile communication industry manifest itself and does it enable new kinds of business models?"

The question can be broken down to two levels. On general level:

- What does literature and different theories say about firms, value chains, value networks and evolution of the preceding?
- What are the current disruptions in mobile communication industry and how will they affect the existing mobile operator value chain and business model?

Furthermore, this thesis concentrates on scrutiny of the MVNO business model

- How does the transition in mobile communication industry affect the earning logics?
- What added value does extremely large and precise distribution channel, such as mobile network provide for companies who have little or no background in telecommunications?
- What learnings can be derived from company cases?

At the moment, MVNO trend is emerging in developed markets, therefore most of the discussion is based on observations and researches from developed markets in the US and in the EU area, such as Germany, Nordic countries and the UK. Thus the conclusions of this study primarily concern the developed markets in the EU area.

The study has been conducted by making a literature research on academical marketing theories and contemporary research of mobile communications, and by interviews and discussions with people working in the field of research of marketing and mobile communications.

1.3 Reading instruction

The thesis consists of seven chapters and is structured as illustrated in Figure 2.

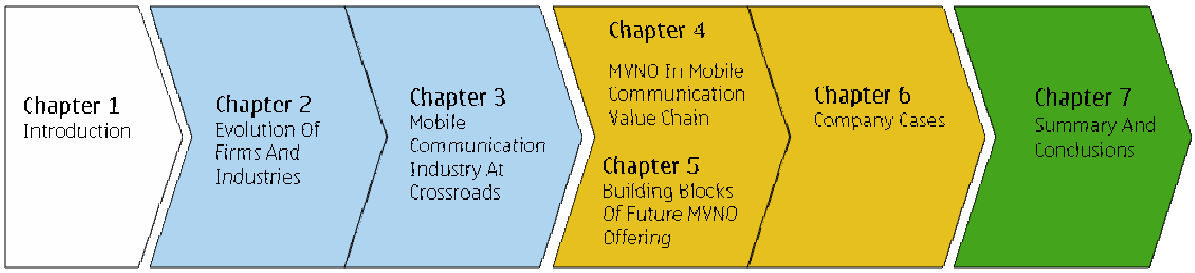


Figure 2 Structure of the thesis

First chapter defines the research problem and the background story that underlies the problem.

Chapters two and three concentrate on explaining the transition that is happening in the structures of mobile communication industry and MVNOs role amidst the development. Chapter two first presents general theories and models how to understand firms, industries and evolution of the precedent. Chapter three concentrates on explaining what are the elements of change in mobile communication industry and how will they affect industry value chain on high level.

Chapters four and five concentrate on analysis of the MVNO business model – the aim is to understand the dynamics of MVNOs and to presents some viewpoints to future of MVNOs. Chapter four presents the definitions and terminology related to MVNOs and discusses the performance of MVNOs so far and reflects it against theory of innovation. Chapter five concentrates on explaining what new earning methods have been identified for mobile services.

Chapter six presents the company cases of two Finnish virtual operators, ACN and Aina Group and additional company case of British machine-to-machine MVNO, Wyless communications.

Chapter seven summarizes all the observations and learnings and discusses results. Also some suggestions for further studies will be presented.

2. EVOLUTION OF FIRMS AND INDUSTRIES

This chapter discusses central theories related to value creation of a company, collaborative company networks and how companies and industries evolve. The aim is to build a theoretical framework for understanding dynamics of companies, business networks and industries. Theories are used later on in the thesis for understanding the transition in mobile communication industry and how to position MVNO in the industry.

2.1 How to perceive a firm?

Firm or company may seem like a totally trivial concept for most people; intuitively one thinks it as a group of people working to achieve a common goal – growth and profit of the firm – in addition to some personal goals of the individuals. As the discussion here is later on broadened to business networks and evolution of firms, it is useful to also understand the theories explaining the existence of firms.

Douma and Schreuder[2] have built a conceptual (Figure 3) framework for understanding the economic aspects of organizations in which they refer to wide set of economic theories. Their scrutiny is based on the fact that life generally is full of economic problems i.e. situations when needs are not met because of unoptimal allocation of scarce resources. Optimal allocation of scarce resources is also the reason why there is an economic aspect in virtually all organizations.

Division of labour is the first step in moving from an economic problem towards a solution. Adam Smith – the founding father of modern economic science – already identified this. As an example, in early days of mankind people were self-supporting; they built their own houses, cultivated and hunted for food, made their own tools etc. Along time as culture and societies advanced, the tasks were disseminated to different sectors of society in order to gain efficiency and increase in productivity. As work is divided to specific tasks people can choose the one that fits best their interests and skills. When people specialize in performing a task they gain experience and are capable of developing new skills or tools to improve the performance. Thus division of labour leads to specialization and gain in productivity. Similar

[2] Douma & Schreuder 2002

type of division of work extends to organizations of today in which people work in order to earn money.

Specialization leads to the situation that people cannot autonomously produce all the goods and services they need. Some goods and services have to be obtained from specialized people; therefore exhancge of goods – transaction – is needed. Since a number of people are specializing in number of tasks, a vast network of exchange is needed. In order to bring the parties together who are willing to engage in transaction and to allocate resources optimally, co-ordination is needed. There are basically two ideal approaches to coordination of transactions – market or organization.

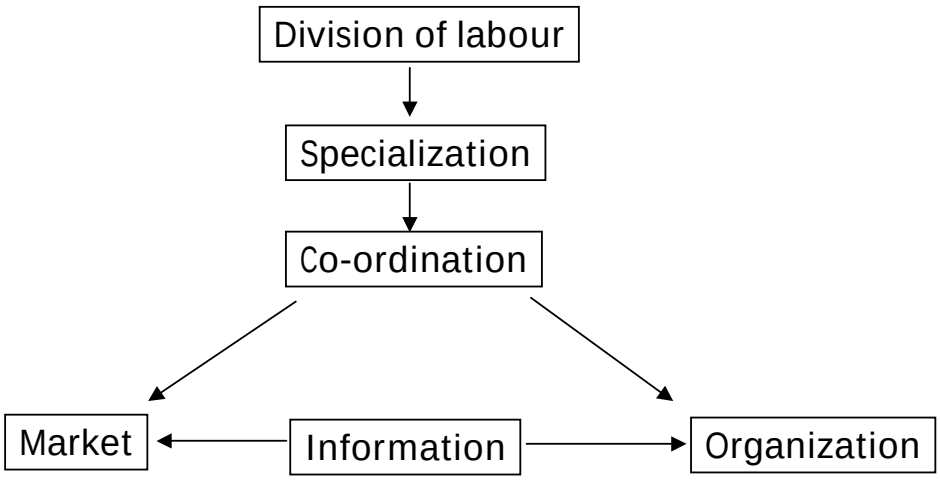


Figure 3 Conceptual framework for understanding organizations[3]

Market is an ideal environment for exchange if price is sufficient information for co-ordination. A close example of an ideal market is stock exchange where the buyer and seller need not any kind of personal contact in order to engage in transaction. A seller may instruct his broker to sell stock at a given price, while the buyer has instructed his broker to buy stock at a given price. It is not necessary to know the other party since price holds all the information needed. Moreover price acts as a device for communication: if demand overshoots supply price goes up, which discourages some buyers while some new sellers become interested in selling because of the higher price. This goes on until equilibrium is reached.

[3] Douma & Schreuder 2002

Although market seems to be functioning ideally in allocating the resources by just using price as co-ordinatig mechanism, not even nearly all exchange does happen by individual transactions in open markets. In fact, modern economy is populated with business firms – why is that? Ronald Coase[4], one of the most cited 20th century economists, explained this with the costs related to using markets and the price system – marketing costs (nowadays economist use the term transaction costs). First of all there is a cost to finding out who sells and for what price (search and information cost), secondly one needs to conduct negotiations possibly with several suppliers that eventually lead to bargain (bargaining and decision cost) and finally draw a contract and see for that the terms of the conract are met (policing and enforcement costs).

Coase argued that because there is usually a cost to using markets, most efficient production process often takes place in a firm. Thus firms may be perceived as centrally planned economies based on people's voluntary choice and mutual agreement. Coase suggested that markets and organizations are alternatives for conducting transactions. On markets, price system is the co-ordination mechanism. In firms, authority has replaced the price system.

According to Coase, the choice between market and organization is determined by the relative cost of transacting under the alternatives. Usually transactions are done at the lowest cost; hence transactions shift between markets and organizations as a function of transaction costs under each alternative.

2.2 Dynamics of firms

A milestone in modeling the dynamics of a firm was reached in 1985 when Michael Porter introduced his value chain framework[5]. The value chain disaggregates a firm into its strategically relevant activities in order to understand the behavior of costs and potential sources of differentiation. In practice, the framework divides the activities of a firm into two types: primary and support activities.

Primary activities have a direct impact on the revenue generation process of the firm, such activities include:

[4] Coase 1937
[5] Porter 1985

- inbound logistics
- operations (activities associated with transforming inputs into the final product form)
- outbound logistics
- marketing and sales
- service

Support activities support the primary activities and by doing so they improve the overall performance of the firm. Support activities include: procurement, technology development, human resource management and firm infrastructure.

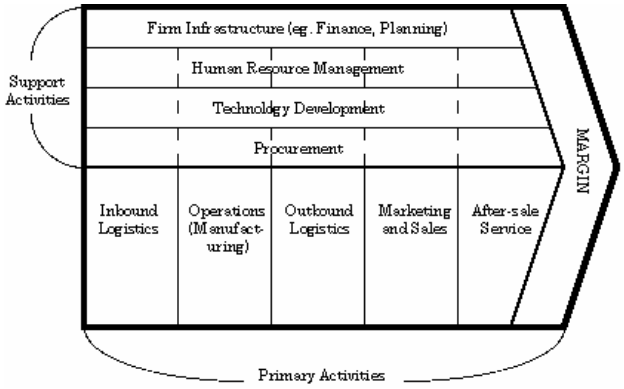


Figure 4 Porter's value chain[6]

Value activities are the building blocks of competitive advantage; each activity's performance determines whether a firm as whole is performing above or below the average. However, one must take into account that value activities are not independent but rather interdependent, therefore competitive advantage frequently derives from linkages among activities just as it does from the individual activities themselves.

Value system

Porter also broadened the value chain concept to a larger context that he calls value system. Much of firm's competitive advantage comes from understanding how the company fits the overall value system. Value system broadens the pondering outside one firm's boundaries and takes a view on a single-industry firm by including supplier value chains (the input to a firm's own value chains), channel value chains (the mediators that deliver the output of the

firm to its buyer, end-user or consumer) and buyer's value chains which a firm's products eventually become a part of.

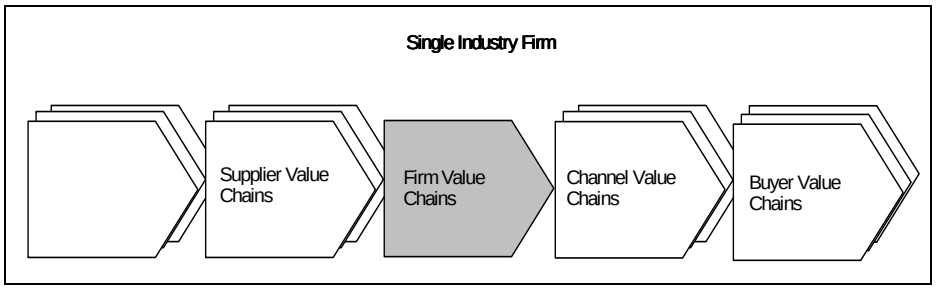


Figure 5 Porter's value system[7]

Generic differentiation strategies

A firm positions itself by leveraging its strengths. Porter states that eventually a firm's strengths fall into either of the two categories: differentiation or cost leadership. By applying these strengths in either a broad or narrow scope, three generic strategies result: cost leadership, differentiation, and focus.

Table 1 Porter's generic differentiation strategies

	Advantage	
Target scope	Low cost	Product uniqueness
Broad (industry wide)	**Cost leadership strategy**	**Differentiation strategy**
Narrow (market segment)	**Focus strategy (low cost)**	**Focus strategy (differentiation)**

Cost leadership strategy calls for being the low cost producer in an industry for a given level of quality. The firm sells its products either at average industry prices to earn a profit higher than that of rivals, or below the average industry prices to gain market share.

[6] Porter 1985, p. 37
[7] Porter 1985, p. 35

A differentiation strategy calls for the development of a product or service that offers unique attributes that are valued by customers and that customers perceive to be better than or different from the products of the competition. The value added by the uniqueness of the product may allow the firm to charge a premium price for it.

The focus strategy concentrates on a narrow segment and within that segment attempts to achieve either a cost advantage or differentiation. The premise is that the needs of the group can be better serviced by focusing entirely on it. A firm using a focus strategy often enjoys a high degree of customer loyalty, and this entrenched loyalty discourages other firms from competing directly.

These generic strategies are not necessarily compatible with one another. If a firm attempts to achieve an advantage on all fronts, in this attempt it may achieve no advantage at all. For example, if a firm differentiates by supplying very high quality products, it risks undermining that quality if it seeks to become a cost leader. Even if the quality did not suffer, the firm would risk projecting a confusing image. For this reason, Porter argued that to be successful over the long-term, a firm must select only one of these three generic strategies.

2.2.1 Modern value configurations

Both Porter's value chain and value system have received a lot of criticism – both justified and injustified. Justified in the sense that value chain is static, heavily related to manufacturing industry and it describes only dynamics of one focal firm[8]. Maitland et al. have criticized the applicability of value chain in telecommunications: "the chain metaphor masks the importance of horizontal aspects of a firm's processes, particularily their relations with other firms" [9]. Partly the criticism is injustified in the sense that Porter himself identified many of the pitfalls of the value chain framework and has later on developed other models.

Several other approaches have been developed lately and couple of them will be elaborated in the following. Although they beautifully address the activities and their interrelationships in modern, more complex value provisioning architectures, they fail to create as easily understandable and userfriendly way of describing the value creation logic of one firm as the value chain does, therefore these different configurations must not be seen as mutually exclusive, but rather as complementary.

Value shop and network

Stabell and Fjeldstad[10] argue that value chain is just one of three generic value configurations and most suitable for describing manufacturing industries. For service industries they suggest a value shop configuration. Shop approach captures that a firm is organized so that it can deal with unique and delineated set of problems: problem-solving resources are concentrated in one place and the problem is usually treated in an iterative manner. In real life this means that a firm concentrates on identifying the problem of the customer, figuring out a way to deliver value through solving the problem, evaluating whether customer's needs were fulfilled and, if necessary, repeating the process. Examples of firms organized as value shops include: medicine, law, architecture and engineering.

From telecommunication viewpoint the third generic value configuration identified by Stabell and Fjeldstad – value network – is the most interesting. Value network models a firm acting in "mediating" industry: the firm configures itself so that it facilitates exchange relationships among a network of customers i.e. it provides a networking service. Examples of firms in mediating industry include: telephone companies, retail banks, insurance companies, Internet travel brokers and postal services.

The primary activities of value network include:

- Network promotion and contract management; customer acquisition activities (promotion, negotiation) and initialization, management and termination of contracts concerning the service
- Service provisioning; establishing and maintaining the network and supporting activities (billing, servicing, etc.)
- Network infrastructure operation; activities related to running a physical (e.g. telephone network) and information infrastructure (customer data)

[8] Stabell & Fjeldstad 1998, Maitland et al. 2002
[9] Maitland et al. 2002, page. 488
[10] Stabell & Fjeldstad 1998

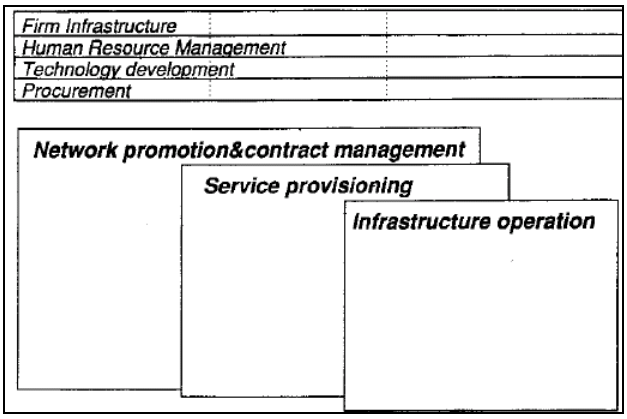


Figure 6 The value network diagram [11]

Value constellation

According to Normann and Ramirez[12], global competition accompanied by changing markets and new technology are creating an environment where it does not suffice just to optimize company's position in the value chain in order to get the most satisfactory result. In such an environment company should focus its strategic analysis on the value-creating system that is the system consisting of suppliers, business partners, allies, customers etc. The focus of this system is not just to add value, but to reinvent the value proposition over and over again: Normann and Ramirez argue that: "…key strategic task is the reconfiguration of roles and relationships among this constellation of actors in order to mobilize the creation of value in new forms and by new players."

The concept of value constellation applies well for modern business where value is usually co-created between different actors. As an example they present the tranisition that has happened in consumer bank transactions along with automatic teller machines (ATMs). In case of ATMs there are at least three players co-creating value: customer selfservicing, bank providing the bank services and the teller machine provider providing the ATM infrastructure and maintenance.

Same example encompasses another important aspect of value constellation. When ATMs were introduced some speculated that people would resists such a change, but quite the

[11] Stabell & Fjeldstad 1998, p. 430
[12] Normann & Ramirez 1993

contrary, people embraced the change with great enthusiasm. The reason is that this new configuration of the cash-withdrawal transaction offered people a qualitatively new kind of value; people were no more dependent on space and time with their bank transactions. This is also the reason why a totally new constellation, with different configuration of contributors, may have a different appeal to customers and therefore companies have to assess and reinvent the configurations over and over again in order to sustain their performance. Compared to the models presented earlier, value constellation is the most dynamic as it stresses the importance of redefining the value proposition.

2.3 Determining the degree of vertical integration in the value chain

The degree of vertical integration fundamentally refers to decision on "make or buy". Coase stated that the choice between markets organizations is determined by the relative cost of transacting on market or inside organization. If a firm exists, then most probably the costs of internal co-ordination are lower than the costs of market transactions. However, determining and explicitly expressing, and drawing conclusions on "make or buy" and border of organization based on transaction cost is rarely straightforward, therefore it is easier to look what other theorists have said about the importance of vertical integration.

With both his frameworks – value chain and system – Porter emphasizes the importance of linkages between activities or separate supply chains. In case of value system Porter especially stresses the importance of vertical linkages and vertical integration[13], which in Douma and Schreuder's framework would mean coordinating activities inside organization. In addition to savings in transaction costs, vertical integration benefits in form of improved communication, coordination and economies between value chain or system stages.

Achrol and Kotler[14] argue that traditional vertically integrated firms are now gradually disintegrating to form internal and external networks. They state that strategic networks will provide companies with significant market advantages. Achrol and Kotler justify their argument by the turbulent nature of modern markets and the development of information technology. Firm's success is largely dependent on its ability to learn and adapt and therefore it is vital for companies to focus on their core competencies and outsource all other activities, rather than optimize the transaction costs.

[13] Porter 1985
[14] Achrol & Kotler 1999

Christensen and Raynor[15] have stated that neither of the approaches, vertically integrated value chains nor focused roles with internal and external networks, is absolutely superior. They argue that the requirement for vertical integration is dependent on the critical dimension of competition: In case a product is not yet suitable for mainstream customers, functionality is the critical dimension and vertical integration over interdependent interfaces in the value chain is needed in order to achieve maximum performance for the product. In case a product has already met the needs of mainstream customers; cost, convenience and customizability become the main considerations and modular service architecture with interorganizational collaboration over modular interfaces in the value chain is more appropriate.

As an example automotive industry in general is horizontal; none of the car manufacturers manufacture each car part by themselves, rather they can choose almost every part from the best supplier. Still the cars with highest performance and quality – Ferraris, Lamborghinis etc. – are a result of vertically integrated value chain where virtually every stage is under control of the manufacturer.

However, the concept of modularity is not simple. Christensen and Raynor argue that specifiability, verifiability and predictability are conditions for a modular interface in the value chain. If an interface is not modular, it is interdependent. The conditions of modularity are very rarely binary, rather every interface is somewhere between interdependent and modular. Thus good competitive strategy is a result of right match between dimensions of competition, architectural characteristics of the product and coordinating mechanisms. Best performing companies use markets to make use of modular interfaces, but organizational mechanisms to integrate their value chain across interdependent interfaces.

[15] Christensen & Raynor 2002

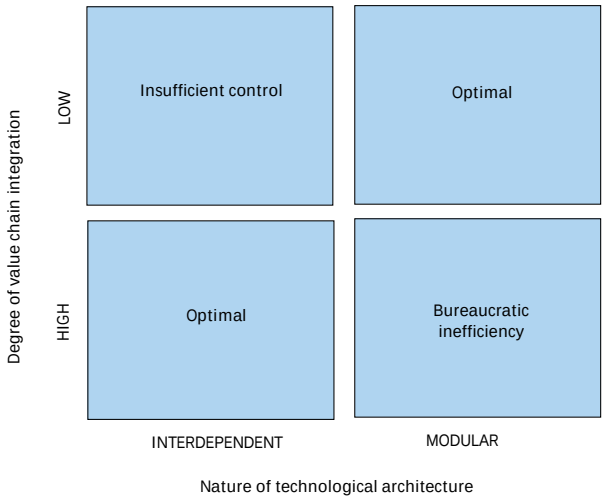


Figure 7 The penalties of mismatch between architecture and scope[16]

Christensen and Raynor's general model for match and mismatch between architecture and scope has been presented in Figure 7. In case the technological architecture is interdependent and functionality is the dominant dimension of competition, hands off approach to value chain integration is a recipe for disaster. Company cannot exercise control over product performance, as they are inable to specify, verify and predict precisely what they want from the supplier. On the other hand vertical integration is harmful if the nature of technological architecture is modular, since company will be suffering from bureaucratic inefficiency and cannot react to sudden opportunities in the market.

2.4 Evolutionary theories

Since the invention of steam machine and the advent of industrial revolution we have seen whole industries emerging, disappearing and reorganizing as a consequence of some disruptive innovation in technology, processes or business models. There are several examples both on large and small scale. Assembly line in the beginning of 20th century is an example of a large-scale change in organizational and even social structures. The invention of airplanes has permanently changed the role of ship traffic as an example of a "small"-scale shift. There are also some exogenous forces such as macro economic changes and changes in consumer behavior that force the companies to adjust their setup. That kind of evolution, however, is outside the scope of this study.

[16] Christensen & Raynor 2002, page 19

Development of the Internet is largely responsible of the movement towards networked organizations as it enables vast and rapid information exchange between companies. At the same time it accelerates the pace of innovation, as knowledge and information get disseminated at an unequaled speed. Moore[17] argues that: "For most companies today, the only truly sustainable advantage comes from out-innovating the competition", therefore understanding the role of innovations, disruptions and their implications on the business environment is vital. Although evolution as a phenomenon seems unpredictable and random, there are some theories how companies and industries react and reorganize at the time of disruptions and discontinuities.

2.4.1 Creative destruction

More than half century ago, Joseph Schumpeter presented his ideas of "creative destruction"; a process of industrial transformation that accompanies radical innovation. In Schumpeter's vision of capitalism, innovative entry by entrepreneurs was the force that sustained long-term economic growth, even as it destroyed the value of established companies that enjoyed some degree of monopoly power[18]. Creative destruction is a powerful economic concept because it can explain many of the dynamics of industrial change: the transition from a competitive to a monopolistic market, and back again. It has been the inspiration of endogenous growth theory and also of evolutionary economics.

2.4.2 Collaborative relationships and environmental shocks

An industry may experience a major environmental shock that causes disruption. Mitchell and Singh[19] define these shocks as: "a sudden and substantial change in technology or market segmentation". They have conducted a vast research encompassing business cases of 973 firms operating in the hospital software systems industry over a 31-year period. The basic hypotheses underlying the study were that in commercialization of complex goods collaborative relationships are superior to independent approaches assuming the stability of operating environment, but amidst external shocks the survival of the firms partly depends on the collaborative approach the firm has taken (technology-centered vs. marketing-oriented).

The results showed that of the 265 businesses using collaborative relationships 153 survived to the end of study, the rest either exited or were acquired by other companies. From 708

[17] Moore 1993, page 75
[18] Schumpeter 1942
[19] Mitchell & Singh 1996

companies that remained independent throughtout the study only 273 were operating by the end of the research period. The results concerning the impacts of external shocks were favorable for the independent businesses, although not as clearly as the hypothesis suggests.

Mitchell and Singh conclude that during environmental shocks, firms with collaborative agreements for activities that reside at the focus of the shock face a great threat of going out of business. Firms with independent approaches or collaborative agreements outside the focus of the shock are more likely to survive after an environmental shock. But as soon as the dust settles, collaborative relationships start gaining advantage in relation to independent approaches.

2.4.3 Disruptive innovation theory

Christensen has approached the evolution of firms through reflecting the performance of industry leading companies against disruptive innovations. In his books "Innovator's dilemma"[20] he presents theory on the implication of innovations on performance of established, incumbent firms, which he further develops in "Seeing what´s next"[21]. The fundamental research question underlying his observations is "why do good companies often fail when an industry change happens?"

[20] Christensen 1997
[21] Christensen, Anthony & Roth 2004

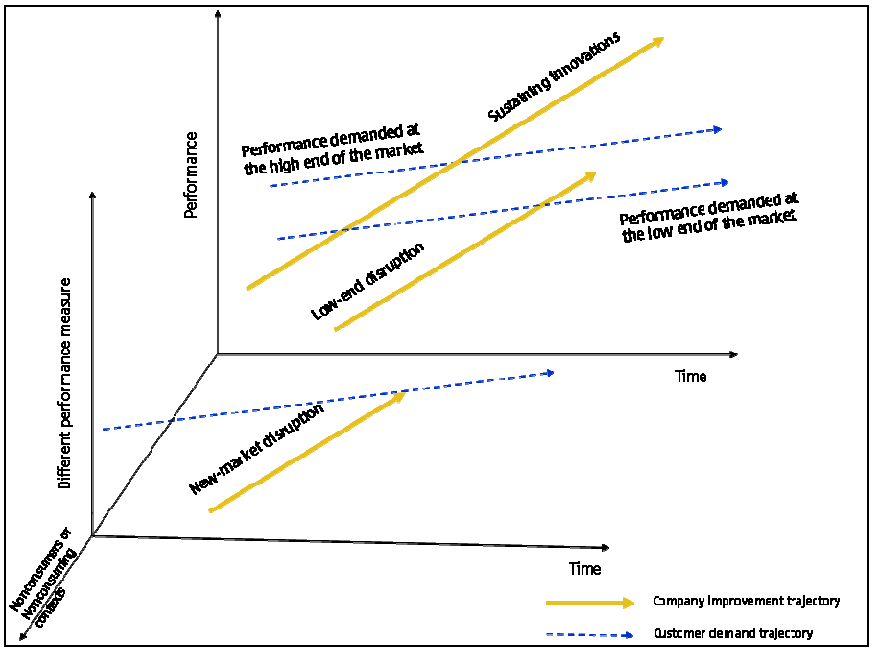


Figure 8 Disruptive innovation model[22]

Figure 8 presents Christensen's model for disruptive innovation. The solid lines represent the company improvement trajectories i.e. how products or services get better over time. The dotted lines the level of performance that customers can absorb. As the figure shows there are certain quite stable minimum and maximum levels for the level of performance that customers can absorb. The figure presents three types of innovations: sustaining innovation, low end disruptive innovation and new-market disruptive innovation. In order to identify new opportunities and possibilities for innovation, companies should look at three customer groups:

1. Consuming customers who are undershot
2. Consuming customers who are overshot
3. Nonconsumers, who are not consuming any product or consuming only in inconvenient settings

As Figure 8 shows, these three customer groups are addressed by different means. If the customer base is dominated by undershot customers, then it pays off to improve established

[22] Christensen, Anthony & Roth 2004

product's dimensions by sustaining innovations. According to Christensen and Raynor[23] at this point it pays off to be vertically integrated, since product's performance and functionality are the critical dimensions of competition. This is the most usual type of innovation.

At some point the development of the established product or service overshoots customer requirements and the amount of customers who are not willing to pay for further improvements in performance grows significant, which creates an opportunity for low-end disruption. Low-end disruption refers to offering least-demanding customers basic services with lower price tag, possibly because of different business model than the established companies are using.

Third customer group, nonconsumers creates the possibility for new-market disruption that has the greatest potential for long-term industry change. New-market disruptive innovations often lack the functionality of existing products but bring new benefits, such as convenience, customization or lower prices. Nonconsumers refer to either a finding a totally unaddressed niche in the market or providing existing services in a new context. For example, introduction of telephone created a totally new market niche, local telephony services. Although it could have started competing for the customers of telegraphy it did not, since the original telephony technology was too restricted for long distance communications. Along time telephony developed and became increasingly popular and eventually took over telegraphy. On the other hand, mobile telephony introduced a new context for using a telephone, but has caused a change in industry structures just the same.

Competitive battles between incumbents and entrants

It is interesting that telephony firms have not vanished after the introduction of mobile telephony as it was with telegraphy firms after the introduction of telephony. Christensen identifies that the company's ability to master a disruption is dependent on company's resources, processes and values. Basically this is a question of:

1. Does firm have or can it marshal the resources required to attack an opportunity?
2. Do the firm's processes effectively and efficiently facilitate it doing what needs to be done?

[23] Christensen & Raynor 2002

3. Do the firm's values allow it to prioritize one opportunity over other options in the plate?

Resources, processes and values are also the determinants of asymmetries of motivation and ability that finally dictate whether the entrant can challenge the incumbent in the verge of disruption. In spite of disruption in technology, mobile telephony was well suited for telephone companies' existing resources, processes and values.

Still, in disruptive circumstances entrants often win because they are taking advantages of asymmetries of motivation and ability on their side (see Table 2). Asymmetric motivation is favorable for entrants, since the target customer group and market size is initially not big enough to raise the interest of the incumbent. This provides a shield of protection for the entrant as it gives the entrant time to streamline its resources, processes and values to serve this new customer group. As the new customer segment grows, the incumbent becomes interested. Incumbent's values and processes that serve it well in the established environment become weaknesses when the game changes and new capabilties are necessary. When the incumbent decides to fight the entrant asymmetric abilities i.e. specialized resources, processes and values, provide the entrant with sword to fight the incumbent. At the moment, there are signs that a disruption may happen in mobile industry, therefore Christensen et al. theories are relevant in explaining the ongoing phenomenons.

Table 2 Motivation and ability, shield and sword of asymmetries[24]

What to look for	Definition	Signals
Asymmetric motivation	Firm does something that another firm does not want to do (provides siheld protecting from response)	**-Size of market relative to firm size** **-Target customers** **-Business models in market relative to existing business models**
Asymmetric ability	Firm does something another firm is incapable of doing (provides sword to use during attack)	**-Mismatch between processes required for success and established processes**

[24] Christensen, Anthony & Roth 2004, page 43

3. MOBILE COMMUNICATION INDUSTRY AT CROSSROADS

In order to place MVNO in the mobile communication value chain and to understand the evolution of mobile communication value chain; the ongoing change in mobile communication industry structures and its implications on operators' business models have to be understood. The discussion in this chapter is based on the theories presented earlier, and recent literature and researches on mobile communication industry.

McKnight, Vaaler and Katz[25] have aligned Schumpeter's ideas of creative destruction with the current development of telecommunications industry. They define the creative destruction in telecommunications followingly:

- **The destruction of traditional technological assumptions:** Analog, narrowband, circuit-switched fixed-line networks have been challenged by digital, wideband, wireless and IP-based platforms capable of providing voice, video and data transmission at higher speeds and lower costs.
- **The destruction of traditional regulatory approaches:** The heavy regulatory frameworks that were limiting competitive entry and defining prices, products and services of the monopolistic incumbent telecommunication firms are being replaced by lighter schemes that promote competitive entry and market-oriented pricing mechanisms
- **The destruction of traditional competitive positioning strategies:** Once so clearly defined, profitable and protected positions are being attacked with substitute products and entries from outside the traditional telecommunication field. This challenges firms to frequently redefine their market position, partners, products and pricing.
- **The destruction of traditional industry structures:** The replacement of the clearly defined industry boundaries, entry barriers and market positions, with blurred and fluid industry borders, rapidly shifting interfirm alliances and the unrelenting introduction of cost-reducing product and process innovations.

[25] McKnight, Vaaler & Katz 2001

One can easily see that there is interdependence between the different viewpoints presented above; the latter two viewpoints are a result of the first two viewpoints. This provides a good framework to approach the creative destruction in mobile communication industry as well.

3.1 Creative destruction of technological assumptions

Much of the creative destruction of telecommunications can be explained with the current buzzword of telecommunications – convergence. Convergence has several explanations in the literature. Shepard[26] has captured the nature of convergence quite nicely as he states that convergence manifests itself in three forms: as the convergence of technology, companies and services. In short, technology convergence means that there are no more proprietary networks for voice, data or broadcasting. Thus technology convergence leads to service convergence, since everything can be done over the same broadband, packet-switched networks.

Nonetheless, from mobile operator viewpoint, the most threatening development relates to Voice over IP. Swedish VoIP software Skype has become maybe the most rapidly spread application in the world by raising 24 million registered users in only two years after the first public release27. VoIP combined with new wireless technologies is threatening mobile operators' role as the main providers of mobile communication as they provide alternative, unlicensed way to mobile voice provisioning. Forthcoming years will be interesting in the field of wireless communication as a host of new wireless broadband technologies will be introduced (Table 3). VoIP specialists such as Vonage, Net2Phone and Skype have already launched Wi-Fi handsets and set their eyes on mobile communication market. Major handset vendors are also launching their Wi-Fi-enabled handsets in near future. It is expected that 100 million Wi-Fi-enabled handsets will be sold in 2008, compared to 113 000 sold in 2005.[28]

[26] Shepard 2000
[27] Nokia Business Environment Outlook 2006
[28] Total telecom 2006

Table 3 WLAN vs. cellular: Technology comparison[29]

	WLAN (802.11n and e)	WiMAX (802.16e)	WiBRO	WCDMA	HSDPA	EV-DO 1x	EV-DO rev. A
Frequency	2.4 GHz, 5GHz	3.5 GHz, 2.4GHz	2.3-2.4 GHz	1.9 – 2.1 GHz	Same as WCDMA	800 MHz – 1800 MHz	800 MHz – 1800 MHz
Max Data Rate–Down	600 Mbps in 802.11n	15 Mbps at 5MHz	18.4 Mbps	2 Mbps	14 Mbps	2.4 Mbps	3 Mbps
Max Data Rate – Up	600 Mbps	15 Mbps at 5 MHz	6.1Mbps/ user	2 Mbps/ user	2 Mbps/ user	153 Kbps/ user	1.2 Mbps/ user
Commercial network deployment	2007	End 2007/ 2008	2006 (Korea)	2005	2007	2003	2005
Support for voice	Yes, in 802.11 e	Yes, VoIP	Yes	Yes	Yes	Yes	Yes

Mobile operators are not expected to lose the game of VoIP over WiFi, since many of the mobile operators will complement their offering with mobile convergence solutions such as unlicensed mobile access (Figure 9) or make traffic agreements with VoIP providers[30]. Nevertheless, estimates of the amount of mobile phone use in in-building premises vary from 30%-60%, therefore VoIP is expected to strike primarily the revenues in the enterprise segment, which by definition is the "high ARPU"-segment for the operators. By 2008, VoIP is expected to cause 5 % decrease in total revenue which would mean approximately 8 billion euros in Europe only. In long term along with the development of wireless broadband technologies, VoIP over WiFi or mobile is expected to pose a serious threat to revenues from traditional mobile killer application – mobile voice, as the charges of calls made over WiFi cost 50% less compared to standard mobile charges.[31]

[29] Pyramid Research 2005b
[30] Pyramid Research 2005b
[31] Total telecom 2006

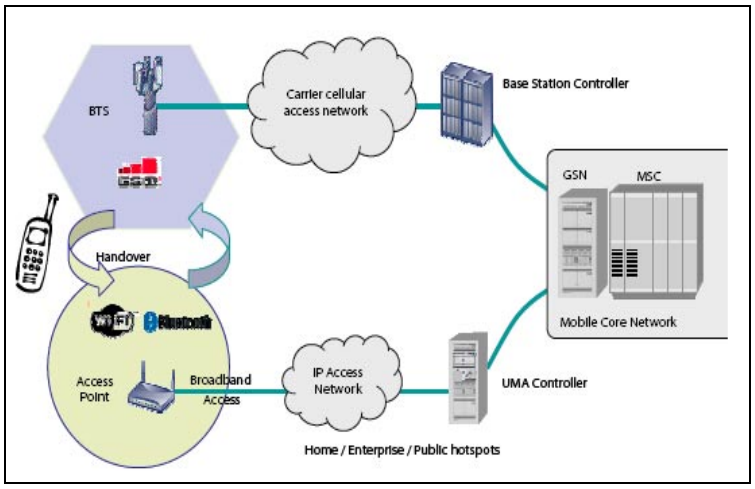


Figure 9 UMA network architecture [32]

3.2 Creative destruction in the regulatory environment

ITU (International telecommunications union) has conducted an extensive, global report[33] on regulatory trends. As the foreword of the report states; as a consequence of convergence phenomenon, many of the regulator's are now pondering whether they should retain control over markets by maintaining the traditional, prescriptive licensing practices, or introduce the kind of flexibility that is needed to tailor services to market need.

The complexity of the current licensing schemes is a legacy from the stepwise opening of telecommunications market. Due to the maturation of telecommunication markets and the convergence phenomenon, the licensing schemes are being revised, if not terminated. Because of the increasingly similar nature of different electronic communication networks, the main issues of licensing in an era of convergence, as identified by ITU, are:

- Technology neutrality – licensee retains the ability to choose which technology and equipment it will use to choose to provide the licensed service. A technology-neutral licensing regime provides a fair and predictable regulatory regime enough to embrace technological and market developments.

  However, sometimes a technology-neutral licensing may conflict with spectrum allocation. In the EU, for example, certain spectrum blocks have been allocated

[32] Nokia 2005

for 3G (UMTS) services. Now the spectrum allocation practices are also being revised in the EU area, as there have been suggestions for secondary market for frequency licenses, in other words license trade[34]. There has been interest towards adopting the concept of Cantor Spectrum Exchange that has for 55 years been brokering electricity and spectrum in the U.S. However, development of secondary market is still under way as it is causing disagreement between EU and local level authorities.[35]

- Service neutrality – The effectiveness of technology neutral licensing can be limited, not only by spectrum allocation practices, but also by setting requirements for the services that license owner should provide. Service neutrality allows the license owner to experiment which services are most cost-efficient or receive the best market response.

ITU's report also defines some key objectives as a motivation for a converged licensing scheme (Table 4)

Table 4 Objectives of converged licensing regime

1	Encourage the growth of new applications and services
2	Simplify existing licensing procedures to ease market entry and operations
3	Create a set of stand-alone regulations so that issues such as interconnection, quality of service, universal access/service, and spectrum and number allocations can be addressed comprehensively
4	Ensure regulatory flexibility to address marekt and technological developments
5	Ensure efficient utilization of network resources, so that individual networks may be used to provide a broad range of ICT services
6	Encourage market entry by a full range of operators, including large scale and micro entrepeneurs
7	Ensure that transition to a converged licensing regime fosters a level playing field among all competitors

EU's latest actions and policy definitions in the field of electronic communications are also nicely aligned with ITU's findings. After the gradual opening of the telecommunication

[33] Trends in telecommunications reform 2004/2005 (ITU)
[34] Helsingin Sanomat 01.11.2005
[35] Tietoviikko 03.11.2005

markets in Europe since 1990, EU's regulatory framework was adjusted in 2002 and was commissioned as of July 2003 – "…in order to take account of convergence phenomenon that has shaped the information technology, media and telecommunications industries over recent years"[36].

Directives from year 2002[37] - especially the directives concerning competition, authorization, interconnection and wholesale access –very clearly show that EU has been moving towards a flexible, technology- and service-neutral, licensing regime and actively brought down the barriers of entry for electronic communications industry. Mobile number portability, which was implemented in 2003, resulted in rush of MVNOs in the market – this suddenly altered the competitive environment in mobile communication that earlier was stable and controlled by license owners.

3.3 Mobile communication industry at the verge of horizontalization

The environmental disruptions in mobile communication industry have been widely discussed in contemporary literature and research of mobile communications[38]. As regards of the evolution of mobile communication industry and markets, there are two schools: One party , horizontalists, thinks that mobile communication industry will become an extension of IP-networks, thus a horizontal, market-oriented structure with focused and specialized roles will prevail. Another body of commentators, verticalists, argues that operator-driven structure with increased amount of vertical integration and value chain coordination by mobile network operators is needed in order to produce successful mobile services because of special, complex nature of mobile services.

Vesa[39] is a supporter of the latter approach. He has identified three dimensions of complexity related to mobile services business, which provide a good framework for understanding the complexity of traditional mobile operator's business model:

[36] Competition directive 2002
[37] See references
[38] Christensen & Raynor 2002; Merry 2005; Pyramid Research 2005a, 2006; ThinkEquity Partners 2005; Vesa 2005
[39] Jarkko Vesa 2005

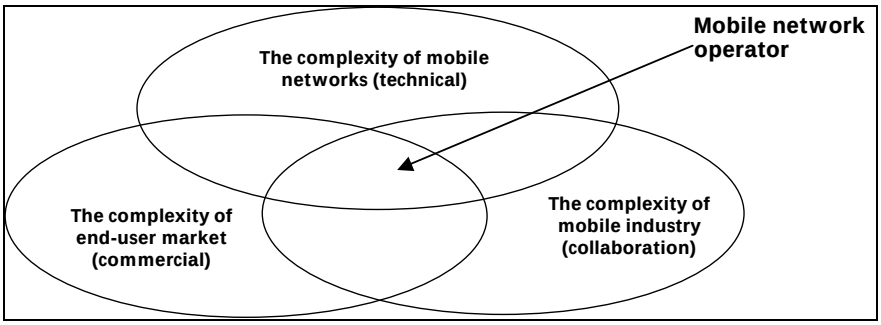


Figure 10 Three domains of complexity in the mobile services industry[40]

First of all, the mobile communication networks, as such, are complex technical systems; secondly the mobile industry with a magnitude of contributors and dynamic boundaries is a complex, adaptive system; and thirdly the end-user market of mobile services is a complex, adaptive system consisting of consumers and corporate customers and different communities. As Figure 10 above shows, mobile network operator is operating in the intersection of the three domains of complexity. Thus it needs several capabilities in order to match all the pieces in the puzzle.

Combining these dimensions of complexity with a basic assumption derived from Mitchell and Singh (*"Complex goods cannot be separated into components without degrading capabilities"[41]),* Vesa has analyzed mobile communication markets and the transition from voice-centered to content-centered in Japan, the United Kingdom and Finland.

Japan, with NTT DoCoMo's i-Mode and FoMa, is probably the most advanced content-centered market in the world, whereas the UK and Finland have traditionally been pioneer markets in Europe, but have fallen far behind in comparison with Japan. Vesa's analysis states that in Japan, NTT DoCoMo has been able to create a successful mix of collaborative relationships and vertical integration, as identified by Mitchell and Singh. On one hand it is highly vertically integrated and dominates in all layers (handsets, services and networks), but on the other hand it provides a vast customer base (49 million subscribers in Q3/05[42]), fair revenue sharing schemes (9% commission for DoCoMo, 91% for the content provider) and easy billing system for the content provider ecosystem. Thus DoCoMo provides a lucrative

[40] Vesa 2005, page 73
[41] Mitchell and Singh 1996, page 170
[42] Merrill & Lynch 2005

and stable platform, which promotes a birth of diverse ecosystem of content providers around itself.

However, it has been argued that much of the success is also due to special regulatory environment which promotes stable market conditions and allows the dominance by few vertically integrated players. There are also some special cultural factors that have been seen as the reason for i-Modes success; low fixed-line Internet penetration in the beginning of 21st century as the most important[43]. Still, Vesa argues that in Europe regulator is to blame for the evident problems with the transition from voice-centric delivery business to multimedia and content-centric service business.

Looking the problem from the viewpoint of horizontalists, regulatory trend in the EU – as opposed to Japan – has for long been towards pro-competition and creating a market driven, horizontal structure – the directives from year 2002 as the best example. Moreover, Europeans have had Internet-based services available widely from the mid 1990's; therefore there has not been demand for mobile e-mail as in Japan[44]. Thus you can easily turn Vesa's question around – why mobile operators have not adapted their business models to new market and regulatory circumstances. Is it rather a question of a mismatch between operational models and the environment? Is it reasonable to try to maintain the control over all three domains of complexity when competition and complexity is increasing in all three dimensions (technical, commercial, collaboration)?

Mismatch between product architecture and scope in mobile communication industry

Christensen and Raynor's conclusions on the mismatch between product architecture and scope provide a good framework to align the arguments of both parties in order to assess the development path mobile communication industry in the EU area.

The question underlying the assessment concerns product architecture – are mobile services a modular product? According to Christensen and Raynor specifiability, verifiability and predictability are conditions for a modular interface in the value chain. Verticalists argue that complexity causes the requirement for vertical integration. As Figure 11 shows GSM, as well as UMTS, are standard-based network architectures with standardized interfaces between

[43] McKnight, Vaaler & Katz 2001
[44] Ville Saarikoski 2006

network elements. In spite of the technical complexity, the conditions for specifiability, verfiability and predictability are fulfilled: therefore technology-wise the product is modular.

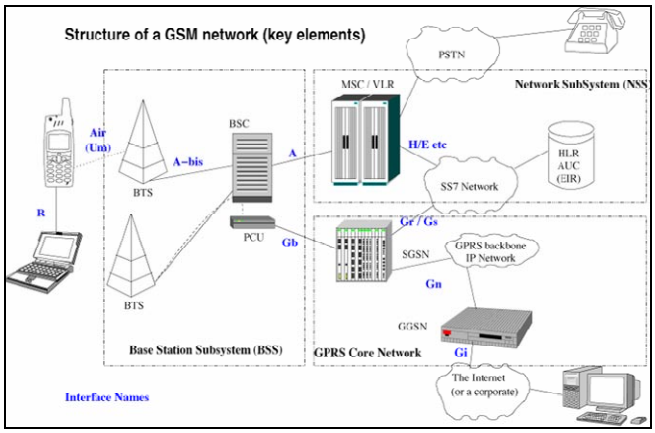


Figure 11 Basic GSM architecture[45]

As discussed earlier the regulatory trend in EU area is showing a heavy push towards horizontalization, therefore the regulatory circumstances neither make an obstacle for product modularization. This leaves business reasons as the main reason for high amount of vertical integration. Although the product has turned modular, network operation with mobile voice as the cash cow has been profitable business with EBITDA margins around 40% - who would want to share that kind of an advantage?

Figure 12 shows how the saturation of end-user market has now caused a declining trend in ARPU development during previous years – reason being that the product is quite homogenous among different MNOs and first MVNOs therefore price becomes the selling argument.

[45] Wikipedia

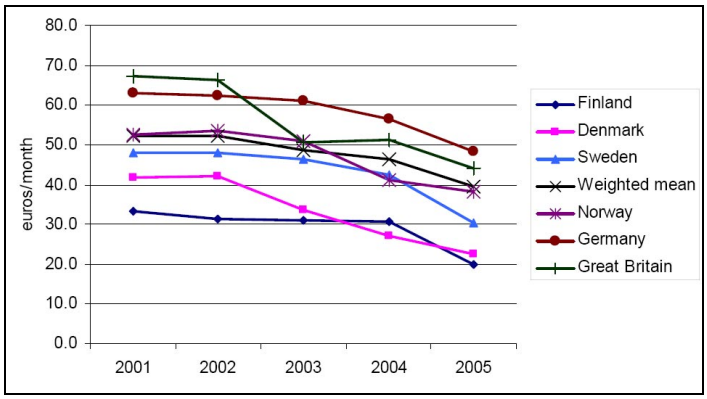


Figure 12 Development of ARPU in European mobile communication markets[46]

ARPU trends combined with the fact that network capacity is underutilized at the moment reassert the conclusion that companies should start specializing instead of controlling the whole value chain - mobile operators are obligated to allocate resources to technical, non-differentiating network operations while they should become more market-oriented as basic mobile services start losing their differentiation value. As an example, nowadays MNO's expenditure on new service development represents an estimated one percent of total operational expenditure, which is quite little compared to estimated fifteen percent spent on network operations.[47]

Aligning this with Christensen and Raynor's conclusions, mobile network operators are now facing bureaucratic inefficiency, since they are integrated over whole value chain although the product has turned modular (see Figure 13). Based on this discussion, one should expect that the path to optimal, equilibrium state is to decrease the amount of vertical integration and concentrate on core competencies, in other words increase capacity wholesale from MNOs to MVNOs. As regards to MNOs, this means choosing between concentrating on the role of service operator or network operator.

Another path to optimal, equilibrium state – as for example Vesa suggests – would be to take the deregulation back i.e. remove the modular interface between network capacity wholesale and service providers and let the mobile network operators and return to the oligopolistic situation as in the early days of mobile communication. This has turned out to be successful

[46] MINTC, 2005
[47] Tapio Meskanen, 2006

in Japan and South Korea, but would call for a total reversal in regulatory trends in the EU-area.

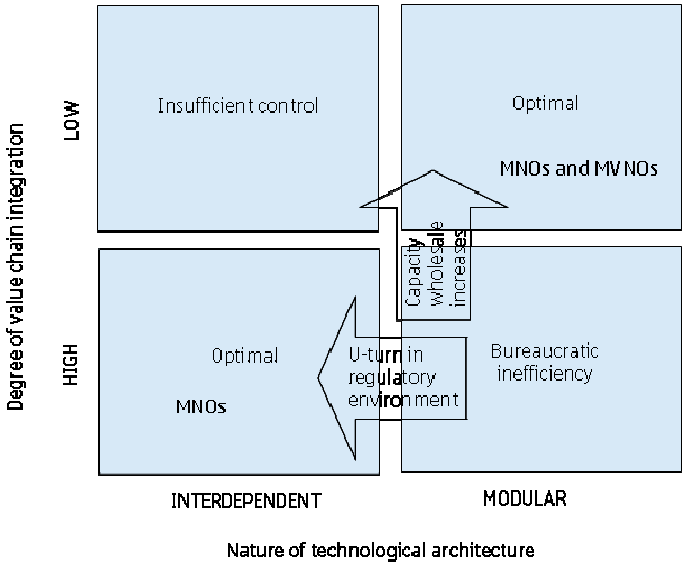


Figure 13 Evolution paths of mobile communication industry in the EU

The rest of the thesis will concentrate on pondering the development path to upper right corner of the above diagram and what kind of possibilities that scenario offers.

4. MVNO IN MOBILE COMMUNICATION VALUE CHAIN

This chapter demystifies the terminology used in MVNO discussion and discusses the performance of first MVNOs

Increase in efficiency and productivity calls for division of labour and specialization[48] - it seems that the development that is seen in the mature markets of the EU today derives even some aspects from the most "primitive", economic theories concerning the general existence of firms. The fundamental dilemma concerning co-ordination of specialized functions is whether it is more profitable to conduct transactions in markets or within organization. In mobile communications, it has not been possible to conduct market transactions within the value chain earlier because of stiffness of regulation. Now deregulation has created an opportunity to conduct market transactions inside the mobile communication value chain, while the saturation of the end-user market and similarities in mobile network operator offering has created demand for specialization in order to increase efficiency and profitability.

This means that besides the traditional, vertically integrated mobile network operator value chain there is now emerging a new, collaborative configuration with specialized roles where each activity is taken care of by a specialized company and its respective network of contributors.

This new configuration is better modeled with modern value configurations. As Figure 14 shows, the central activities of a mobile network operator can nicely be broken down to the three categories of the value network concept provided by Stabell and Fjeldstad[49]. Antoher good analogy for understanding this new configuration is a value constellation, as identified by Normann and Ramirez[50], formed by network operator (NO), mobile virtual network enabler (MVNE) and service provider MVNO (SP MVNO).

[48] Douma & Schreuder 2002
[49] Stabell & Fjeldstad 1998
[50] Normann & Ramirez 1993

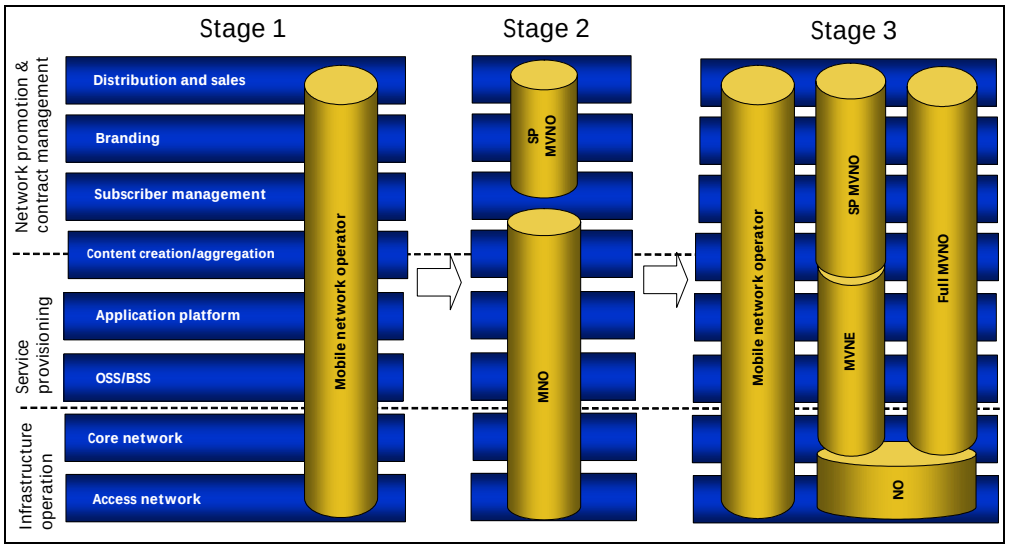


Figure 14 Disintegration of traditional mobile network operator's value chain

Network operator (NO)

Network operator concentrates on the infrastructure operation i.e. it owns radio license and maintains and resells radio network or, both radio and core network. Thus it carries the technological risk related to mobile network operations and concentrates on maximizing the utilization of the network through selling network capacity to other companies. A prerequisite for sustainable MVNO ecosystem (Stage 3) is the existence of full-time wholesale network operators, so that MVNOs may have the independence to differentiate from the offering of the host MNO.

There are not yet examples of pure wholesale network operators anywhere in the world today. This is widely seen as the role of challenger MNOs in the future i.e. third or fourth place operators who already have been liberal for opening their network for reseller MVNOs.

Dutch operator, Telfort, decided three years ago, following a management buy-out that the only way it could compete in a five-operator market was to develop a capacity wholesale business. The venture capitalist company that acquired Telfort for 20 million sold it recently to KPN for 40-fold price. In Finland DNA, the third largest MNO, announced a pure network capacity wholesale agreement with Aina Group in March 2006.

Mobile virtual network enabler (MVNE)

MVNE specializes in service provisioning; it does not own a brand rather it concentrates on creating mobile services for brand owner or niche SP MVNOs. In practice it means running core network, operating and business support systems (billing, customer care systems, data mining for CRM, etc.) Furthermore, it owns an application platform on which it can create basic mobile services (SMS, MMS, core network for packet-based data) and value added services (ringing tones, logos etc.) MVNE's expertise resides in buying the access capacity from NOs at an optimal price and providing basic mobile services and flexible, tailored value added services on which various branded or niche SP MVNOs may create their own operations for example loyalty programs or bonus programs.

MVNEs are not as common a phenomenon as the SP MVNOs already are, but the role is emerging. The driving force for MVNE market emergence lies in MNOs' mass market optimized systems and approaches. It is often difficult for MNOs to support efficiently entrants who, e.g. plan to address niche segments with services that differ from the existing service portfolio of host MNO. German Vistream is one of the first high-profile MVNEs in the German mobile communication market. Finnish Aina Group's partnership agreement with DNA and Nokia provides them with MVNE capabilities. Year 2006 is widely seen as the breakthrough year for MVNEs and it is also seen that much of the success of future MVNOs will depend on the success of MVNEs[51].

Service provider mobile virtual network operator (SP MVNO) and full MVNO

SP MVNO primarily operates in the customer interface. This means taking care of distribution and sales of mobile subscriptions and handsets; brand promotion and marketing activities; customer relationship management and customer service; and possibly creation and aggregation of content and services. SP MVNO carries most of the risk related to the end-user market and its expertise resides in market understanding and the ability to react to sudden opportunities in the market as well as customer appeal through brand and, service or content ownership. Best analogy for describing this role is the end user interface of the value constellation formed by SP MVNO, MVNE and NO.

In MVNO research, SP MVNOs have further been divided to resellers and enhanced resellers. Resellers typically leverage existing customer relationships, strong brand or sales

[51] Pawsey 2006, Pyramid Research 2006

channels and add value by linking mobile offering into existing, non-mobile related products or services. They do not operate telecommunications specific infrastructure but buy necessary services from host MNO or MVNE. Enhanced reseller is an extension of reseller model that covers also subscriber management and possibly billing functions of the mobile value chain. Thus enhanced reseller has more control over the services, end-user pricing and customer interface in general compared with reseller. Later on these two will be collectively called SP MVNOs for simplicity's sake.

Full MVNO is a combination of SP MVNO and MVNE. There are not many examples of such operators yet. Saunalahti in Finland was operating as a full MVNO before the acquisition by Elisa in 2005. Full MVNO is more independent than SP MVNO in decisions concerning its service portfolio, since it owns all capabilities from creation of basic mobile services to content creation and distribution. Full MVNO relationship towards other operators is the one of and independent MNO. Also regulators typically see a full MVNO as independent MNO and allocate rights and responsibilities accordingly. Adopting this kind of role calls for more financial resources and expertise in mobile communications than SP MVNO role.

4.1 Development of MVNO business model

MVNO development estimates regionally have been presented in Figure 15. MVNO market share has risen from practically zero in the late 1990's to eight percent in 2005 in Western Europe. At the same time the number of MVNOs has risen from zero to little over 300 globally; the phenomenon is most common in Europe and in North America where the number of MVNOs are respectively 197 and 69. Nowadays, MVNO market share is about 12 billion euros and accounts for 2.75 percent of the global user base and is expected to rise up to 3.3 percent in 2010.

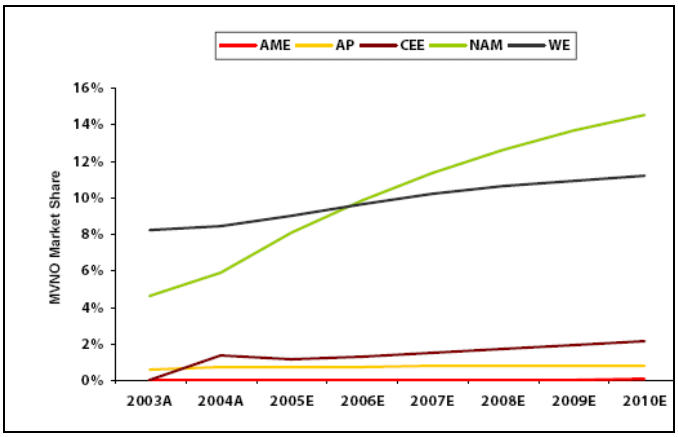


Figure 15 MVNO market share by region[52]

Generally, MVNO business has been built on three advantages: customer acquisition should be less expensive than that of an MNO because of possible existence of established distribution channel and absence of customer handset subsidy; customer churn should be lesser than that of an MNO because of MVNOs ability to focus on its customer segment and develop services accordingly; unit cost of a customer should be smaller because of lower cost of day-to-day telecom operations.

This has been reflected as a great difference in the cost structure and profits of MVNOs and MNOs (Table 5). The difference is in favor of MVNOs in operating costs. The number of subscribers per employee is on average four times greater for MVNOs, the best example is Danish Telmore that can address as much as 7000 subscribers with one employee. An MVNO also pays less for both acquisition (CPGA) and maintenance (CCPU) of the customer.

[52] Pyramid Research 2006

Table 5 KPI comparison between MNOs and MVNOs. Light green background indicates an advantage[53]

	MNO	MVNO	Unit
ARPU	43.11	16.58	€
EBITDA	31	12.5	%
Customer churn	2.1	3.9	%
Subs./employee	1000	4000	
CPGA	291.8	44.765	€
CCPU	21.55	12.435	€

Contrary to MVNO business principles, customer churn rates have been higher for MVNOs. Much of the difference is because MVNOs have mainly been targeting low ARPU users; profitability has been reached by cutting costs wherever possible e.g. Internet-based customer service and distribution. Consequently, EBITDA margins have been lower for MVNOs.

4.2 Future of MVNO business model

MVNO is still a new phenomenon in the mobile communication industry. The ongoing structural change in mobile communication industry has resulted in an emerging opportunity for mushrooming of the MVNO business model in all its forms - SP MVNO, MVNE and full MVNO.

VoIP combined with a selection of high-speed data networks and WiFi-enabled handsets pose a serious future threat for the revenue from mobile voice and interconnection fees that constitute a major part of mobile network operator as well as MVNO revenues at the moment. Thus in future, both MNOs and MVNOs are facing a problem how to generate growth and profit when the nature of mobile communication business is shifting from voice-centered to content- and service-oriented.

MVNOs ability to focus on marketing activities instead of maintaining and controlling whole mobile communication value chain should provide them with advantages as regards to creating differentiating services, but so far MVNOs have not been able to take full advantage of the horizontal operating model. Why is that? Why the established giants have not dropped

[53] Pyramid Research 2006

down on their knees before a disruption in operating model? Christensen's[54] theories on innovation and competitive battles between entrants and incumbents are useful in explaining MVNO performance so far.

Until now, the MVNO model has mostly been about offering cheaper, rebranded mobile network operator's services and controlling and reducing own overhead costs. This makes a clear match with what Christensen defines as low-end disruption. Christensen argues that the incumbents have two choices when they are facing a disruption – fight the entrant or flight and focus on most profitable customer groups. In case of first MVNOs, the incumbents have often chosen to fight this low-end disruption by establishing their own low-end brands. How have the assymetries of ability and motivation, shield and sword, worked out for first MVNOs?

Table 6 Asymmetries of motivation and ability

What to look for	Definition	Signals
Asymmetric motivation	Firm does something that another firm does not want to do (provides siheld protecting from response)	**-Size of market relative to firm size** **-Target customers** **-Business models in market relative to existing business models**
Asymmetric ability	Firm does something another firm is incapable of doing (provides sword to use during attack)	**-Mismatch between processes required for success and established processes**

- Size of market relative to firm size and target customers have not provided the shield of protection, since "low-ARPU"-customers is quite ambiguous customer segment. It might even be big market relative to incumbent's size and therefore the incumbents have not wanted to risk anything, rather they have chosen to fight the low-end disruptors.

- Business models in market relative to existing models, which is in favor of MVNOs - they are executing their operations with lower cost structure. Still,

[54] Christensen 1997, Christensen, Anthony & Roth 2004

because of infancy of MVNO ecosystem, so called MVNO paradox (see 4.2.1) has mitigated the advantage.

- Asymmetry of abilities has not existed. Incumbents can also provide low-cost services and usually can outlast the low-end disruptors.

However, there are already examples on how MVNO model can be utilized to differentiate with service or in Christensen's terms cause a new-market disruption: Virgin mobile, the pioneer of MVNOs, has been selected as the best customer service company in the UK for five consecutive years. In Germany Ay Yildiz is targeting the Turkish immigrants with customer service in Turkish and with special tariffs for calls to Turkey.

4.2.1 The MVNO paradox

A major paradox of MVNO and host network relation has been that the MVNO is both reliant on the host network operator, while often competing with it[55]. Global regulatory trends as well as the high-level regulation in the EU are increasing competition in the mobile communication market thus increasing possibilities for MVNOs. Nonetheless, current thinking in the EU area is that MVNO market entry will not be mandated nor the capacity wholesale prices regulated, rather it will be the competitive forces that dictate whether there is an opportunity for MVNOs.

As discussed in 3.3 competitive pressures combined with the saturation of the market and underutilization of network capacity are forcing some of the current mobile network operators to look into exploiting the full potential of the mobile network by opening capacity wholesale to MVNOs. This would support the expansion of the MVNO business model. This development is, however, still very market-specific. At the moment, the best way to attain a wholesale partner and negotiate favorable terms is primarily based on MVNOs ability to prove that it can better address customers that the host network operator cannot, and avoid cannibalization of the host network customer base[56].

[55] Merry 2005
[56] Pyramid Research 2005a

5. BUILDING BLOCKS OF FUTURE MVNO OFFERING

As the mobile industry enters the next stage characterized by content and service orientation, ARPU will become the fourth business consideration of MVNO business model. Although basic mobile services (mobile voice, SMS, MMS, mobile data etc.) will remain an important revenue element in near future, in mature markets their value is eroding, therefore in long term the growth of revenue has to be obtained from somewhere else.This chapter discusses what factors have been identified as the building blocks future MVNO offering and earning logic in contemporary research.

The chapter begins by presenting some important aspects that relate MVNO differentiation and positioning strategies, which may be utilized in order to increase revenue from mobile services. Then special characteristics and application of mobile devices as marketing media will be reviewed. Finally, the discussion will be summarized in form of a conceptual framework for analyzing the offering of next generation MVNOs.

5.1 Differentiation strategies

Porter's general differentiation strategies are useful in explaining what the differentiation strategies of companies in mobile communication industry are (Figure 16). MVNOs generally build on the fact that large mobile network operators with multimillion subscriber base do not see the potential in and are inable to tailor their service according to needs of small affinity groups. However, there is difference between different MVNOs as regards to what strength the company uses to position itself.

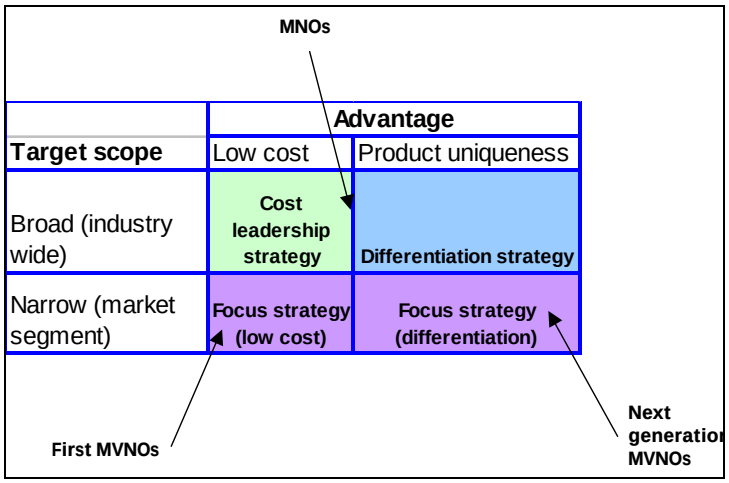


Figure 16 Differentiation strategies in mobile communications

First MVNOs have mostly been reseller MVNOs who have mostly been distributing host MNO services under their own brand and having the focus on targeting the customers that are looking for nothing more than lowest price, but MVNO also provides an opportunity to target focused customer groups with specialized, focused and content-rich service offerings. Consequently there is greater opportunity to charge a premium based on the service uniqueness. Such services could include anything from machine-to-machine communication enabling for enterprise segment to medical services for health conscious consumers. A company that already has an established brand and a loyal customer base has an advantage in launching a focused differentiatior MVNO.

Some real life examples of companies taking a focused differentiation strategy, although not European, are Mobile ESPN (Entertainment and sports programming network) that was launched in the US market during 2006 Super Bowl, which is primarily targeting the sports enthusiasts that already subscribe ESPN's TV programs, magazine and website by offering real-time box scores from sports events, possibility to track favorite players and exclusive Mobile ESPN content. According to ESPN demographics for its website, 89% of its audience is college-educated with a median income of 77 000 US dollars, furthermore 95% of them are male.[57] Another example from the U.S. market is Disney mobile that is targeting families with little children; the idea is to enable safe communications between the family members by providing such services as Family Locator, Family Monitor and Family Alert.

[57] McElligott 2005

Proprietary content

For large content owners who already have an established position in other medias – Internet, television, radio and magazines – mobile devices are a natural extension to their distribution channels. While the possibility to catch revenue from the same content one more time may seem a valuable business proposition in founding a content-centric MVNO, mobile content will not be the future's sole source of revenue[58]. A great amount of targeted content is rather a way to differentiate in the market and appeal to a focused group of customers.

5.2 Mobile devices as marketing media

Virtanen and Raulas[59] have discussed the special characteristics of mobile devices and mobile content that support and restrict their usage as marketing media. An important, but overlooked aspect of mobile devices is their usage as bi-directional marketing media and for aggregating data on customer behavior.

The main benefit of mobile devices, from marketer viewpoint, relates to their targetability – it is possible to target a user geographically and demographically – and traceability – it is possible to gather and analyse usage data from mobile devices. These two main characteristics make mobile networks a lucrative platform for marketing. Table 7 presents their findings in a summarized form.

[58] KPMG 2006
[59] Virtanen & Raulas 2004

Table 7 Benefits and restricitions of mobile devices as marketing media [60]

Benefits	
Intimacy	Typically people have single mobile identity (mobile subscription) that is tightly bound to the user, as opposed to newspapers, TV or e-mail. Moreover, marketing activities may be targeted using context information such as preferences, earlier activities, time or location of the subscriber
Reachability	Mobile devices belong to individual users and, in addition to wrist watches, it is the only device that is typically always carried by the users. Thisenables communication between marketer and consumer independent of place and time.
Interactivity	As opposed to TV or printed media, mobile communication is a bidirectional media, which enables realtime dialogue between marketer and consumer and direct transaction
Traceability	Mobile technologies enable realtime information gathering on personal level, but also time-, location and situation-boundedly, thus they enable contextual marketing
Restricitions	
Physical restrictions	Processing capabilities and user interface of mobile devices are restricted because of the requirement for small size. This also sets limitations for usability of interactive multimedia content as marketing media
Intrusiveness	Mobile devices are typically switched on independent of time, therefore marketing through mobile device may be experienced as disturbance of other activities
Cost of delivery	When compared to Internet-based content delivery, the usage of mobile as marketing media is restricted by cost of delivery.

Development of mobile handsets and the transition towards packet-switched technologies will reduce the restrictions that relate to physical size or performance of the handset and cost of delivery. Intrusiveness is possibly the greatest obstacle when it comes to using mobile devices for marketing purposes. This has also been addressed in EU directive concerning protection of privacy in electronic communication, which states that marketing through electronic channels calls for permission from the consumer.

Although there are some restrictions, it is clear that there are great benefits in mobile devices – especially when compared to newspapers, TV or e-mail – when it comes to direct marketing, advertisement, customer relationship management. Gathering feedback data from adoption of a service is valuable information as such for a service provider. Moreover, a networked environment – such as mobile networks – enables targeting social networks that communicate and share similar demographics and interests, which is a valuable sales item to offer to advertisers[61]. This is a lucrative proposition for many companies that have traditionally resided outside of mobile communication industry, but do have highly recognized brand, established customer base and consumer appeal.

[60] Virtanen & Raulas 2004

Mobile advertising

Mobile advertising and sponsorship have been highlighted as potential revenue generators of the future. Until now they have experienced relatively little success. However, the advances in handset and wireless technology are enabling more sophisticated and advanced marketing mechanisms. Figure 17 presents the growth estimates of investments in mobile marketing in Europe, which suggests that mobile advertising would be finally taking off. Keeping in mind the special characteristics of mobile devices it is justified to assume that mobile advertising will increase.

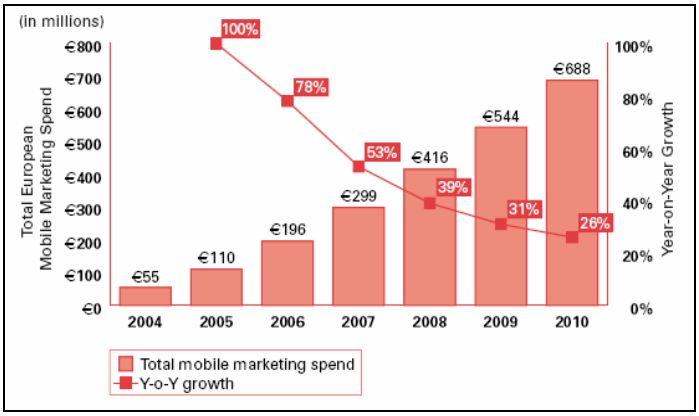


Figure 17 Growth estimate of marketing investments in mobile media in Europe[62]

The business model of MVNOs for mobile advertisement will most probably be based on corporate sponsorship and subsidization. It seems that consumers are not willing to increase their expenditure on mobile services because of new mobile content services. KPMG study shows that roughly 70% of consumers are not willing to pay more than one dollar for a song download on their mobile terminal. [63] This would suggest that MVNOs should leverage their focused, relatively homogenous customer base as a selling argument for advertisers and earn revenues from the advertisers as opposed to content users themselves.

Ancillary services

For large content owners mobile devices provide a new distribution channel thus mobile content (videos, games etc.) and sponsorship is central strategy element for them, but

[61] Discussions with Ville Virtanen
[62] Seminar on Mobile Advertising and Commerce 2006
[63] KPMG 2006

especially ancillary value added services should become of interest for many companies, especially retailer companies such as Tesco in the UK or Wal-Mart in the U.S.

Ancillary services refer to services that are not included in, but are enabled by the prescribed service; an area of particular interest could be enabling mobile payment. The ability to purchase services and products by using mobile device opens up several opportunities for increasing revenue from services additional to the subscription, moreover mobile payment combined with location based information provides companies with means for contextual marketing i.e. reach the customer when the impetus to buy is strongest – in the retail environment. Extremest development of ancillary service strategy could be to use MVNO as means to increase the profitability of business as whole i.e. use the mobile subscription as means to promote the ancillary services whereas the MVNO as a separate business unit does not necessarily need to be highly profitable.

Biggest challenge related to offering ancillary services through mobile payment relates to country-specific financial regulation and EUs e-money regulation, in which the position of an MVNO is still very unclear[64]: On one hand mobile operators and premium service providers who are working in close co-operation with mobile operators have been granted an exemption from EU's e-money directive[65] i.e. the requirement to become licensed as Electronic Money Institution (EMI) in order to provide value added services. On the other hand the directive only concerns purchases made online or virtual data services, it does not include purchases offline or tangible goods. Crediting customer by using mobile subscription would therefore be theoretically illegal without possession of EMI license. However, companies with crediting and payment processing infrastructure already in place could be better positioned to start offering mobile payment capabilities.

Framework for analyzing next generation MVNO cases

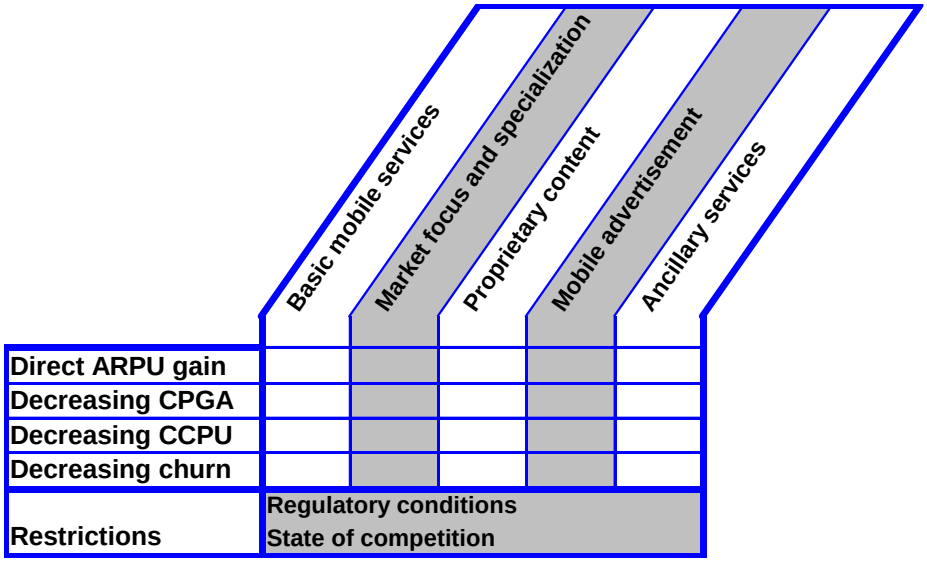
Table 8 summarizes and visualizes preceding discussion on next generation MVNO strategies. First of all, rather than building company strategy solely on cost-cutting, content provisioning or advertisement, it should be built on a bunch of cornerstones. In a company case each of the revenue generation opportunities elaborated in the upper edge of the table should promote at least one of the basic principles of next generation MVNO business – increasing ARPU, decreasing CPGA, decreasing CCPU and decreasing churn – in order to

[64] Merry 2005

create a sustainable business case. Most preferably each of the revenue generation opportunities should contribute as direct gain in ARPU, but the basic principle of the analysis framework is that the more checked boxes in the grid the better the business case.

Restrictions are the factors that relate to MVNO paradox as identified 4.2.1, understanding these factors will provide understanding on the existence and capabilities of MVNO business and have to be pondered separately case by case.

Table 8 Framework for analyzing business cases of next generation MVNOs



[65] See references

6. COMPANY CASES

This chapter presents company cases of two Finnish MVNOs: ACN communications that came to the Finnish market as one of the first MVNOs, and Aina Group with its Armas concept, a regional mobile service that combines the mobile subscription with newspaper subscription.The company cases will be scrutinized against theories of innovation and the next generation MVNO framework in order to understand how the MVNOs have taken alternative approach to create revenue in a matured market and how it affected their performance. Third company case on Wyless Communications gives an insight on how MVNO business model can be utilized in order to provide unique, new mobile services

6.1 ACN communications and Armas Concept from Finnish market

6.1.1 ACN background

American Communications Network, founded in Southfield Michigan in 1993, is one of the biggest direct selling telecommunications companies globally. From its very beginning, ACN has profiled as a reseller company that specializes in utilizing network marketing skills. Nowadays, they are offering telecommunication services varying from fixed line telephony to mobile telephony and Internet services including VoIP.

ACN communications started its operations in Finland in November 2003 as a service provider MVNO in Sonera's network. ACN's value proposal was very straightforward; it provided free calls amongst all ACN subscribers. Customer acquisition was made by using network marketing i.e. anyone who was entrepereneurial enough could become an ACN representative and start seducing new ACN subscribers in hopes for commissions.

At first, ACN's approach seemed like a success; in only five months it raised a customer base of 250 000 subscriptions, which is quite honorable amount in such a short time. However, already in mid 2004 Kolumbus (discount brand of Elisa) was offering free phone calls from Kolumbus to over one million Elisa subscriptions, Sonera had launched its own discount brand TeleFinland and there were dozens of other MVNOs, mostly offering cheap calls. At this point, consumers had become quite indifferent for the service provider. ACN had to also set a 1000 minute limit for the free calls among ACN subscriptions. Competitive situation may have had some impact on the decision, but there are also rumours that ACN's

competitors were fighting ACN with its very own weapons by subscribing ACN and keeping the lines open around the day, thus severly damaging ACN's finance.

Throughout its operations in Finland, ACN was also suffering from bad publicity concerning its billing and customer service that was poorly reachable and located in Estonia. ACN's story in the Finnish mobile communication market ended only one and half years after its beginning; in February 2005 ACN announced its withdrawal from Finland stating that "the market situation had changed so much during the 1.5 years the company had operated in Finland." During the next two months ACN subscribers were transferred under Sonera's discount brand TeleFinland.

6.1.2 Aina Group and Armas concept background

Aina Group is a conglomerate based in Hämeenlinna Finland that consists of three branches of companies that support each other: media, telecommunications and information technology. Hämeenlinna and surrounding areas combined have a population of nearly 100 000 residents. Regional newspaper Hämeen Sanomat has a circulation of 30 000 and it is also distributed to Hämeenlinna's surroundings. Hämeen Puhelin, fixed line telephone company, has 40 000 subscribers and 23 000 cable TV subscriptions.

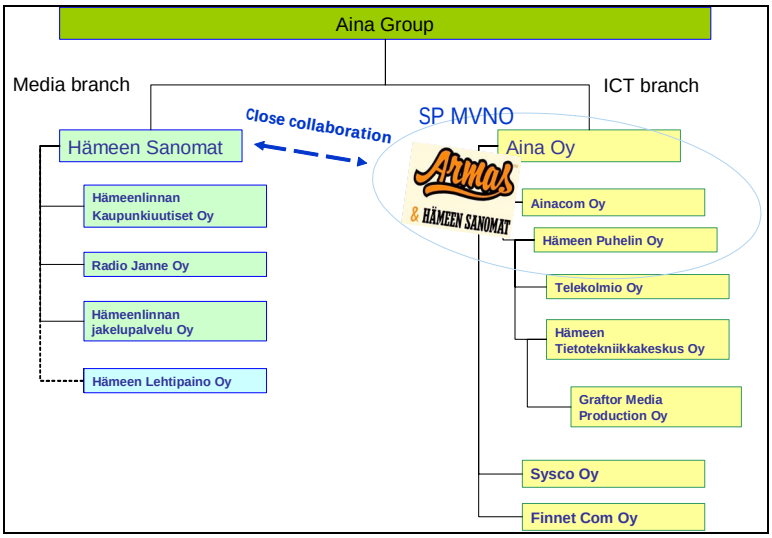


Figure 18 Company structure of Aina Group

Few years ago company became worried about their future revenue in one of their primary business branches – telephony services; since the usage of fixed line telephony was

constantly declining. Company initiated a project which aimed at creating a product that utilizes company's existing capabilities, whose maintenance should be profitable and the concept should be easily replicated[66].

In February 2005, Aina started operating as an SP MVNO in Sonera's network and opened its regional mobile service directed for Hämeenlinna region residents – Armas subscription. Armas' idea was not to be a price differentiator rather it appealed to consumers through regional services and special offers for Armas subscribers. The prices of voice calls and SMSs and other basic mobile services were set on a competitive but not the lowest level in the market. Table 9 presents a price comparison between three service providers in Finland. Unit price indicates the combined price of one unit of each product, ARPU per month has been calculated with average usage numbers in Finland in 2005 (280 minutes of voice calls, 47 SMSs and 0.24 MMSs per month). With Armas subscription the assumption is that 10% of communication happens among Armas subscriptions.

Table 9 Comparison of prices of basic mobile services in Finland. Cheapest prices of each service provider in May 2006.

	Armas	Saunalahti	Sonera
Calls within the same network	0,059*/0,089 €/min	0,069 €/min	0,079 €/min
Calls to other networks	0,089 €/min	0,069 €/min	0,079 €/min
SMS	0,059*/0,089 €/pc	0,069 €/pc	0,079 €/pc
MMS	0,29*/0,39 €/pc	0,35€/pc	0,039/pc
Unit price	0,497*/0,657 €/unit	0,557 €/unit	0,627 €/unit
ARPU/month estimates	28.137384	22.647	25.84236

**to other Armas subscriptions*

Armas was launched as an extension to Aina Group's regional newspapers Hämeen Sanomat. Four primary reasons promote this kind of approach: Firstly, the cost per gross acquisition (CPGA) is cheaper since the promotion of Armas subscription goes hand in hand with the newspaper. Secondly, the newspaper and the mobile subscription have a common interface to consumers and advertisers, thus the mobile subscription acts as an extension to newspaper advertisement which adds to the value of advertisement in exclusive "Armas section" in Hämeen Sanomat. Moreover, the media section of Aina Group has an established network among advertisers, which is lacking from the MVNO. On the other hand, the special offers from advertisers add value on top of mobile subscriptions that creates brand

[66] Talouselämä 18/2005

stickiness. Thirdly, Armas subscription is primarily targeted for Hämeen Sanomat standing-order subscribers. In other words not for young people who run after the latest features or lowest prices, but rather for people who switch mobile service providers once during lifetime.

6.1.2.1 Regional services provided by Armas subscription

Content services

The content services follow the same logic of regional scope as the whole Armas concept. Content services include free Hämeenlinna region phone directory, free Hämeenlinna region weather service and free newschannel where people can read latest reports or interviews of local ice-hockey team – HPK. The media section in Aina Group provides Armas subscribers with the mobile version of Hämeen Sanomat and event guide of Hämeenlinna region.

Advertisement channel

The most popular service of Armas subscription has been the advertisement channel. The basic principle is that in Hämeen Sanomat there is a separate, exclusive section for Armas offers from where the partner companies buy advertisement and get the mobile extension to their advertisement. The partner companies give monthly and weekly special offers for Armas subscribers, these advertisements are presented in the Armas section of the newspaper, in the WAP-portal of Armas and on Armas web page. The advertisement fee depends on the amount of mobile subscriptions. A certain amount of SMS based advertisement that can be sent at any time is also included in the advertisement fee; this service is naturally optional for the subscribers.

Figure 19 presents an excerpt of Armas advertisement; the advertisements are clearly branded as Armas and Hämeen Sanomat advertisements, which make the Armas subscription more familiar for the newspaper subscribers. As the figure below shows, the offers vary from hamburgers to jigging gear to coffee brewer – all the offers combined result in as great as 290 euro benefit. Armas subscribers can make use of these offers by showing their mobile phone in the partner businesses.

Figure 19 Armas advertisement in Hämeen Sanomat

6.1.2.2 Future of Armas concept

Armas subscription has been live for a bit over one year has raised a 7% market share[67] in its operating area, Hämeenlinna region. This would mean roughly 4000-5000 subscribers, which may not seem much, but is actually 400-500% growth year-on-year during a year when average churn of a mobile operator has been over 10%. Armas is targeting 50 000 subscribers during three years and number one mobile operator position in Hämeenlinna area. One must also bear in mind that Armas is a concept that has been created in order to target small customer segments and create regional services; and to be replicated to other areas. In March 2006, Aina Group made a capacity wholesale agreement with DNA, the third largest mobile network operator in Finland. This agreement combined with partnership with

[67] Kalle Tarpila's estimate in April 2006

Nokia provides them with full MVNO capabilities, in other words it gives them the ability to charge from interconnection to other networks, total independence in creating their mobile services and further reduces the cost of mobile operations (CCPU). This is an important development in taking the next steps in Finnish communication market if and when Armas concept is replicated to other regions. In these cases Aina Group will act as an MVNE and get the revenue from mobile voice and data while providing the "Armas-like" service concept to another regional newspaper; the first discussions with other media houses are already on the way.

6.1.3 Competetive battle between incumbents and entrants in Finnish market

Figure 20 below presents ACN's business case aligned with theory of innovation. ACN represented low-end disruption in Finnish markets and the story is quite similar to general competitive setting between MVNOs and MNOs so far, as described in 4.2. ACN's business model did not possess enough assymmetries of motivation and ability.

- Target customer group was ambiguous and relatively big in relation to company size. A 250 000 customer group in a five million subscriber market is interesting also from incumbent viewpoint, and did not provide the shield of protection to avoid incumbents attacks while developing specialized resources, processes and values.

- Incumbents' resources, processes and values were also aligned for fighting for low-end customers. Basically, it was just about offering the same services with a lower price tag. ACN had not developed specialized enough resources, processes and values to have the sword to fight the attack.

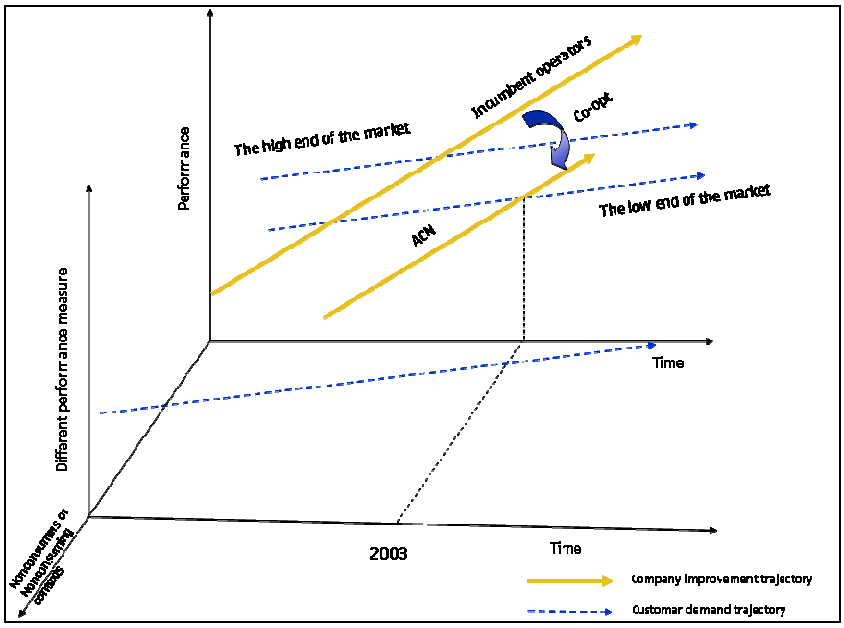


Figure 20 Competetive setting between ACN and incumbents

Armas is providing similar services to incumbent operators, but in clearly different, regional context, therefore Armas' performance is measured on different scale than that of a traditional mobile operator. Traditional mobile operator's performance is usually measured by dropped call rates, coverage, queueing time to customer service whereas Armas subscriber may also be interested in how great weekly benefits they get from the subscription or how good inside information they get on the local ice-hockey team. Armas concept clearly represents new market disruption in form of connecting mobility to regional services and by appealing to people through one of the basic needs, greed to get things cheaper.

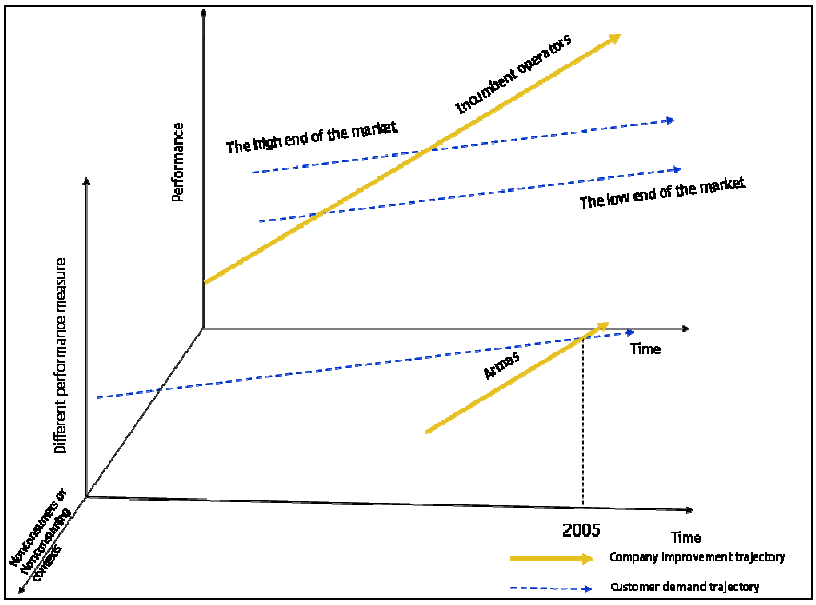


Figure 21 Competetive setting between Armas and incumbents

Another way of justifying the illustration in the figure above is to study the asymmetries of motivation and ability.

- Regional focus of Armas delimits its potential customer base to approximately 100 000 customers, which makes it lesser threat in the eyes of the incumbents. Yet there have been no signs that any other mobile operator would start competing especially for Hämeenlinna area subscribers. Asymmetry of motivation works for Armas' favor and has provided the shield of protection from incumbents attacks.

- Asymmetries of ability become even more interesting as Aina Group starts operating as MVNE and offers Armas concept to other media houses. At this point, the company may sound the alarm bells of incumbent companies, since it may threat significantly larger part of incumbents' revenues. Still, it is difficult for incumbents to start creating similar services, since their machinery (resources and values) has been designed to target millions of customers and they have not established processes to connect the mobile subscription with regional services.

6.1.4 Next generation MVNO offering - ACN vs. Armas

As Figure 22 shows, there is not much to tell about ACN company case– ACN came in as a clear price differentiator with the aim to make business profitable by decreasing CPGA. However, it is exaggeration to speak about market focus or specialization since the competitive advantage was taken away in only half a year and customers were switching service providers based on who gives the best merchandise (skijacket, canoe, etc.) in return for switching over.

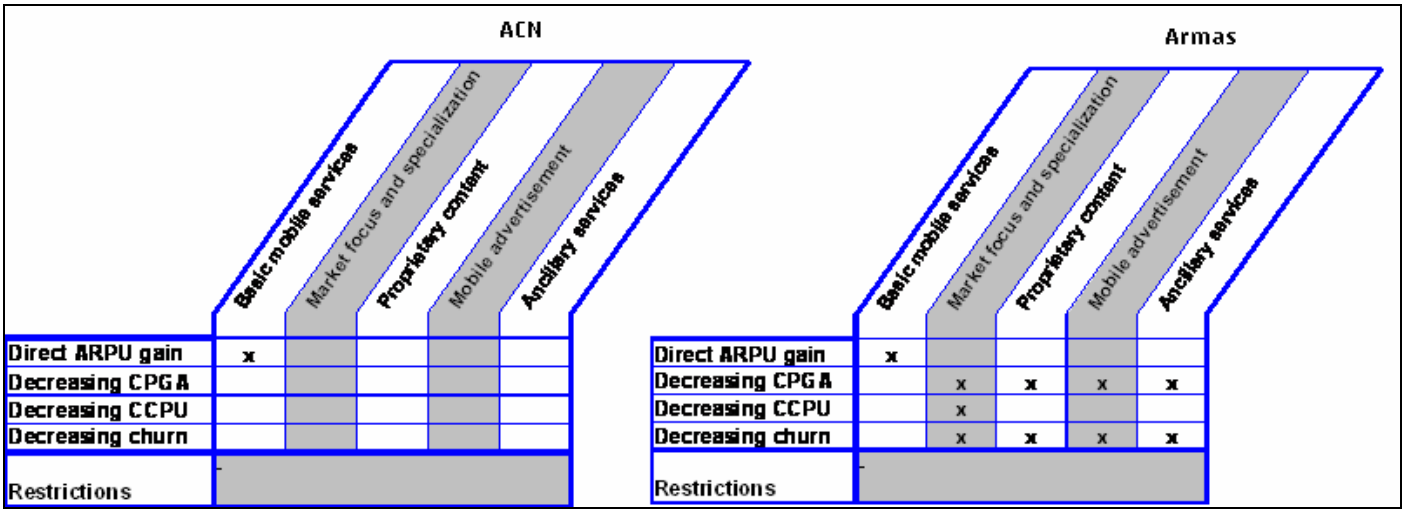


Figure 22 ACN vs. Armas in light of next generation MVNO offering

There was no proprietary content that nor mobile advertisement or ancillary services that would contribute to the four corner stones of MVNO business. There have been doubts whether ACN was ever profitable during its one and half year lifecycle in Finland. The only area where ACN truly excelled was decreasing CPGA through network marketing. Since it does not map to the building blocks of next generation MVNO offering, it is not visible in the figure above. This however, leaves the two other corner stones of MVNO business unattended and most certainly is the reason for ACN's failure.

At the moment, basic mobile services constitute 100% of Armas' ARPU and the situation is expected to remain similar also in the foreseeable future[68]. If the case would be studied on Aina Group level, the advertisement money could be added directly to ARPU calculations, but at the moment the advertisement money goes to the media branch Aina Group.

[68] Interview with Kalle Tarpila, April 2006

In case of Armas, market focus and specialization become especially highlighted as it has impact on three cornerstones of MVNO business. Focus on Hämeenlinna area residents and especially Hämeen Sanomat subscribers, and marketing hand in hand with the regional newspaper reduces the cost of customer acquisition (CPGA) and maintenance (CCPU), since there is no need for a vast distribution network or for excessive marketing campaigns in country-wide media. Most importantly, focusing primarily on Hämeen Sanomat standing-order subscribers has had a great impact on customer churn; Armas' churn figures are as low as 2%.

Armas has some proprietary content, but it does not contribute in any way to ARPU since all proprietary content is free for the subscribers (e.g. local phone directory, mobile version of Hämeen Sanomat, Hämeenlinna event calendar, HPK-inside). However, most certainly these kinds of services are of value for Hämeenlinna area residents, therefore they contribute to willingness to switch service provider (CPGA) and willingness to stay with the same service provider i.e. churn.

Mobile advertisement and ancillary services are a vital part of Armas service concept, although they do not contribute to Armas' ARPU directly. Advertisement channel has quickly become the most popular service of Armas and the benefits provided by it works as a great incentive to switch service provider. The most beautiful aspect of the advertisement channel is that it is a self-inducing phenomenon i.e. the more subscribers, the more advertisers and special offers – the more advertisers the bigger the benefit is for the subscriber.

6.1.4.1 Restrictions

In Finland, EU's regulatory framework has been in effect since August 2003. Moreover, it was commissioned in user-friendly manner i.e. so that consumer has no additional cost of porting the number and porting has to be done within two weeks. In ACN's case, the entry to the market was really easy. According to Antti Arponen, director of ACN's telecom operations in Europe, it took only a couple of months for a few people to start a new mobile service operator in Finland. Armas entered the Finnsih mobile communication market, while the Finnish mobile communication market was at the fiercest phase of price war. At that time, the attitudes towards reseller SP MVNOs had become less hospital, as MVNOs were seen as the scapegoat for the price erosion and high churn numbers. Armas' regional scope and

pricing above the average prices in the market most certainly eased its position in negotiations with Sonera.

As Aina started negotiating about becoming an independent, full MVNO in the market, the situation had changed fundamentally. Many of the reseller SP MVNOs had exited the market or were acquired by MNOs. Still there were no regulatory restrictions for making a pure capacity wholesale agreement, but the first wave of reseller SP MVNOs had destroyed the reputation of MVNOs and MNOs were reluctant to host any more MVNOs. After negotiations with all of the network operators, the agreement was made with DNA, number three network operator in Finland. The reasons for DNA being willing to facilitate a full MVNO might be many, but two of the most important are DNA's challenger role in the Finnsih mobile communication market and DNA's internal structure that clearly separates network operator from the service operators.[69]

6.2 Wyless Communications, British machine-to-machine MVNO

The company case will not be analyzed in similar depth as Armas concept; rather it will be presented as an example on how companies may utilize the horizontal, MVNO model in order to conduct business that takes advantage of the mobility provided by cellular network, combines it with special expertise that lacks from the MNO and at the same time totally avoids the obstacles of MVNO paradox.

Wyless PLC was established in 2002 by founders of Interoute – a company that provides wireline connectivity services primarily for enterprises across Europe. Wyless communication targets enterprises that own assets that must be controlled or tracked from distances such as electricity meters, vending machines, displays/information kiosks or oil pipes. Wyless communication concentrates on offering solutions for automatic meter reading (AMR); asset tracking; surveillance and security; and remote monitoring.

The traditional MNO's machine-to.machine solution portfolio consists of SIM-cards, M2M-pricing plan, dedicated customer service and assistance in design and implementation; apart from that everything is handled by partner companies.

[69] Interview with Kalle Tarpila April 2006, Interview with Vilhelmiina Wahlback 2006

Wyless has simplified the M2M-solution both technology- and businesswise (Figure 23): On technology side, it has developed proprietary technology that provides fixed IP-addressability, secure data transfer and compression. Moreover, Wyless M2M-solution does not require timely and costly system integration projects – back office management is handled by Wyless back office systems and can be accessed through web-based interface via secure public internet connection. On business side, it has established and orchestrates a network of 31 partners, and has a footprint that covers already 69 countries. The GSM connectivity is provided by T-Mobile, but even more interestingly, T-mobile has also invested in the company and is classified as a strategic partner of Wyless. Wyless charges fixed monthly fee per SIM-card that covers both domestic- and international traffic.

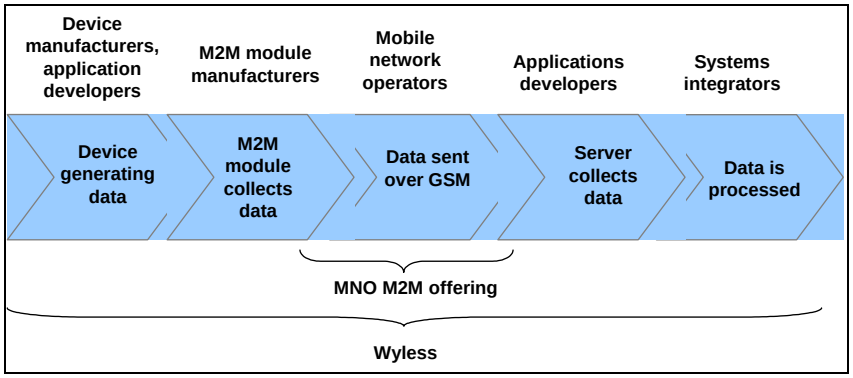


Figure 23 Machine-to-machine solution portfolio

Wyless' case shows how MVNO business model can be utilized in order to specialize and to concentrate on core competencies. In case of Wyless those are the ownership of patented technology and the ability to coordinate network of partners, whereas mobility represents only one fraction of its offering. At the same time, it provides so great benefits for a mobile network operator in form of increased data traffic that the operator does not see the MVNO as a competitor. Quite the contrary, T-Mobile sees the benefit in even investing in the MVNO.

7. SUMMARY AND CONCLUSIONS

This study presented an analysis of the general development of mobile communication industry and scrutinized the role of mobile virtual network operators amidst the development. First, a literature review and a summary of organizational, economic and marketing theories was conducted in order to understand what are the fundaments that explain the general existence of firms, how can internal and inter-organizational dynamics of firms be modeled and how can evolution of firms and industries be explained.

Although all of the preceding may sound like high-level philosophy, one must bear in mind that in order to put real-life observations and phenomenons in right perspective one must have firm theoretical background. As seen throughout the study, these concepts are useful in explaining many of the on-going phenomenons in mobile communication industry as well.

Different aspects causing a structural change in mobile communication industry were explained and their implications on mobile industry value chain – the choice between vertical or horizontal – were discussed.

One recent phenomenon of mobile communication industry, different variants of mobile virtual network operators, was explained. First on theoretical level, and as seen, some of the reasons for MVNO phenomenon can be traced back to most “primitive” organizational theories. Secondly, different contributors in mobile communication ecosystem of mature markets were explained. Moreover, hitherto financial performance of MVNOs was studied and compared to that of the traditional players – mobile network operators. This was reflected against the theory of innovation.

As the industry evolves, so do the earning logics. As stressed many times the value of basic mobile services is eroding very quickly, and new revenue streams have to be invented. Some of the most promising near future means of making money from mobile services were discussed. Based on this a framework for analyzing sustainable next generation MVNO business cases was developed. Furthermore, the framework was applied on two company cases from the Finnish mobile communication market. One additional company case was presented in order to further explain the benefits of MVNO business model.

7.1 Results

As with the original research question of this thesis, the results shall be discussed on two levels. On general level, to summarize the theories explaining economic and organizational phenomenons of real life, and to connect the theories with the structural change of mobile communication industry. On more practical level, where does MVNO fit in the development of mobile communication industry, and what are the advantages and disadvantages of MVNO business model? Most importantly, what learnings can be drawn from real life company cases?

Industry in the verge of horizontalization

Technological development, in form of convergence of technologies, services and industries, and deregulation were identified as the global drivers that drive the change on industry level. Voice over IP and VoWLAN, although still a marginal business when compared to cellular voice, are already posing a significant threat to revenue from mobile voice in developed markets. As cellular broadband HSPA-technologies are rolled out, Cellular over IP will become the next hot topic. At that point the nightmare of every CEO in mobile industry – "voice becomes noise" – is very close to come true.

In the early days of mobile communications, the competitive environment was either monopolistic or duopolistic in virtually every market due to regulation. Figuratively speaking, one can draw an analogy from the medieval feudal system where the vassals get the right to levy a tax from their subordinates as far as they submit to some obligations towards the feudal lord. In case of mobile communications this has meant the obligation to guarantee certain network roll-out schedule and coverage, after that a mobile operator has quite free hands.This was naturally also due to the fact that at that time mobile networks were commonwealth infrastructure projects.

As the markets and technology have matured, the regulator has awakened to open the markets for competition. In Europe this happened in 2002 as EU approved the new directives concerning the new regulatory framework. Full implementation of EU's new regulatory framework and its side-effects pushed the operating margins of mobile network operators to a steep downhill.

As discussed in Chapter 3, there are two schools of thought, vertically integrated or horizontal, when it comes to way forward in mobile communication markets in EU. Theories presented by Christensen and Raynor[70] concerning the evolution of industries and the importance of aligning the operational model with product architecture and general environment provide a good theoretical framework to make the two viewpoints discuss. Christensen[71] states that when technology overshoots mainstream customers, their choice evolves from functionality to convenience, customization and price. In many matured markets you can already see this happening (see Figure 12).

Christensen and Raynor have identified that if functionality is the main competitive dimension, best product is the result of interdependent value chain and it pays off to be vertically integrated. If there are modular (specifiable, verifiable and predictable) interfaces in the value chain it is more efficient to concentrate on own core compentencies instead of coordinating everything inside organization.

It was identified that neither technological nor regulatory circumstances are the obstacle for product modularization. This leaves business legacy as the main reason – mobile network operators are used to owning all the control points in mobile services value chain and it is not easy to switch to another mindset overnight.

However, declining revenue has now rung the alarm bells of mobile network operators. This combined with the widely known fact that there is a lot of excess capacity in mobile networks nowadays, calls for searching efficiencies through more efficient network usage. In Christensen and Raynor's terms many of the mobile network operators are now suffering from excessive vertical integration over value chain, in other words facing bureaucratic inefficiency in their operations. As scope, convenience and customization become emphasized vertical integration over value chain becomes harmful, therefore it is to be expected that forthcoming years take the companies towards more horizontal operating modes as presented in Figure 14.

Still, very few of the mobile network operators are truly pondering on becoming a pure network operator. Telfort's example from Dutch market shows that capacity wholesale business can be a profitable business as well. It will also be interesting to see, how the

[70] Christensen 1997, Christensen & Raynor 2002

Japanese market will evolve as Vodafone recently sold majority holding of its Japanese operator to a capital investment company, Softbank. As far as capital investment companies are concerned, they only seek for best return on investment; hence they have no reason to neglect wholesale strategy in mobile communication business.

In many instances, mobile device industry has been compared with computer industry. However, car manufacturing industry gives better analogy to understand and predict the development of mobile service markets. First stage of the market, the growth phase, is similar to the beginning 20th century when automobile as such was new and valuable for consumers. At the dawning of automotive industry companies were highly vertically integrated; Ford Motor Company owned even the mines that were supplying the metal to car production.

During its hundred year lifespan, car as a product has evolved from a necessity to a personal, highly emotional, and even communicative product. It may appear odd that nowadays some people are willing to pay 50 000 euros for a sports utility vehicle that brings little added functionality when compared to 5 000 euro hatchback. Yet it is reality, and actually only a matter of careful segmentation and brand ownership. Simultaneously, the general structure of the industry has turned from highly vertically integrated to horizontal – for example, hundreds of exhaust pipe manufacturers can be found with a quick search in Internet. The next stage of mobile communication markets should resemble what the automotive industry is nowadays.

Hitherto failure of MVNOs

Taking into account the observations concerning the search for efficiencies and horizontalization of mobile communication industry in general, it is fair to say that horizontal virtual operator business model will become increasingly relevant in the future. As the vertically integrated value chain disintegrates to collaborative configuration, MVNOs will to a larger extent be responsible of the end-user interface.

It was identified that MVNO's business is basically built on excelling in two areas in relation to MNOs: in customer acquisition by having lower acquisition costs, and in customer maintenance by having lower maintenance costs and customer churn. Precedent combined

[71] Christensen 1997

with average revenue per user levels similar to those of MNOs should result in better EBITDA margins. However, it turned out that although MVNOs have mushroomed recently in the markets of EU and U.S., they have yet to prove their ability to lower churn and to collect same, not to mention higher ARPU than that of MNOs.

Although all preconditions for a disruption are in place, MVNOs have not been able to utilize the opportunity to full extent. Disruptive innovation theory provides conceptual model for understanding the reasons for this. So far, MVNOs have taken the easy path by choosing to be low-end disruptors. Christensen[72] states that it is more difficult to sustain competitive edge in case of low-end disruption if the incumbent chooses to fight the entrant, because of lesser assymetries of motivation and ability. So far, this has proven to be true. In addition to asymmetries of motivation and ability, MVNOs dependency on MNOs mitigates the relative advantage provided by leaner operating mode. It seems that in order to establish theirselves in the market a new market disruption has to take place i.e. new market segments or new context for using existing services have to be invented.

Next generation MVNO offering

As all of the players in mobile sevices industry are facing the ongoing price erosion of basic mobile services, new ways of raising revenue have to be invented. Steve Jobs, one of the founders of Apple computers, has been preaching the importance of content and user experience for years[73] - the same applies for mobile services. Content services will become a differentiating factor in the future and at that time the proprietor of the content is the kingpin. As the launch of Mobile ESPN and Disney show, this is already happening.

However, one should not expect content services to be next “killer application”. In fact, it may be that one should stop expecting technology to provide the “killer application” whatsoever, since many believe that Internet already is that. Still, mobile devices hold some qualities that cannot be found in other communicative devices; two of the most important are their intimacy and reachability – mobile device is personal and people carry them on wherever they go. This makes them interesting marketing platform, which, quite surprisingly, has not yet been tapped to its full potential.

[72] Christensen, Anthony & Roth 2004
[73] Simon & Young 2005

Because an MVNO is able to target rather focused and homogenous customer base it is able to avoid collateral waste in marketing campaigns, thus it is in better position to get in talks with possible advertisers. The most intriguing way of utilizing mobile marketing is using mobile subscription as “bait-and-hook”-strategy where the mobile subscription is not the essence of the business rather it is used to increase the profitability of the business as whole. Just as an example world’s largest retailer company Wal-Mart could partner with an MVNO; Wal-Mart could use location-based or time-based information to execute advertisement, deploy its customer loyalty programs through mobile devices and possibly even credit its customers with the mobile subscription. Think about customer arriving to her local branch, first checking the special offers available for her exclusively today from the info screen at the entrance, then browsing through the selection getting information on the products with the RFID-reader in her mobile device and finally walking to the cash register and paying by utlilizing a secure connection over GPRS.

Learnings from company cases

Finally three real-life company cases were presented in order to observe how the MVNO operating model has been put in to use. First two company cases from the Finnsih market turned out to contrast with each other quite heavily. ACN that had come as one of the first MVNOs based its strategy solely on cost-slashing and aggressive pricing. As it turned out, mobile network operators with deeper pockets were able to fatigue this kind of players out of market. This reasserts the conclusion made earlier on the insufficiency of assymentries of motivation and ability in case of low-end disruptors.

As Armas entered the market, ACN had already shown what the strategy to enter the market certainly is not. Armas has introduced a new, regional context for using mobile services, which clearly differs from the traditional offering of mobile operators. As discussed earlier, this has provided already at least one year protection from the attacks of incumbents. It will be more interesting to see how the asymmetries of ability work when the concept is replicated to other areas. Based on Christensen’s disruptive innovation theory you can say that regional focus of Armas concept has what it takes to create a new market disruption in Finnish market.

The two buiness cases were also reflected against the next generation MVNO revenue generation opportunities. It also turned out that Armas has considerably more balanced

service portfolio and thus is certainly better equipped to survive in future competition. Moreover, Armas has introduced the kind of partnershipping that is enabled by horizontal operating model of MVNO and on the other hand required to differentiate in the market.

Wyless company case on the other hand reasserts the conclusion that MVNO operating model is fundamentally superior to MNO when it comes to creating innovative mobile services. Wyless is able to manage a business network of 31 partners to provide end-to-end machine-to-machine solutions, since it has outsourced the connectivity provisioning part of its offering. On the other hand, Wyless as well as Armas, have also avoided the pitfall that many of the first MVNOs have not – they are not competing MNOs with MNO weapons, rather they are providing such unique value to customers that MNOs are incapable of offering.

7.2 Applicability of results

Mobile communication industry is approximately 20 years old, MVNOs have come in to play during last five years. Although it may turn out that as a result of aggressive price wars the first wave of MVNOs thins out significantly, it most certainly will not be the end of MVNOs in the market. The MVNO phenomenon has yet to establish its final form, but most certainly it is here to stay. This can be backed up with the fact that the amount of virtual network operators is already almost 300 only after six years of existence.

However, studies should be conducted at least ten years onwards in order to tell what the ingredients for successful MVNO business are. Disruptive innovation theory and qualitative analysis framework presented in this study is one way of analyzing company cases and is based on current research in field of MVNOs. Along time, as the MVNO business matures and knowledge on MVNO business increases, it may be possible to establish a commensurable, quantitative method to analyze MVNO business cases.

7.3 Issues for further studies

While conducting this study, several issues for MVNO studies have passed my mind. As stated earlier in the study, regulatory and competition are obvious issues concerning MVNO entry, but yet there is very little knowledge on what are the technological pain points concerning MVNO entry. For example, can the vendors provide solutions that are scalable

and flexible enough for small customer segment needs? What are the technical obstacles facing MVNOs could be an area worth deeper scrutiny.

As the mobile operators and MVNOs look to reduce their operating expenses, hosted services and technology platforms have become increasingly popular. It would be interesting to see how hosting affects the startup of an MVNO – e.g. time to market, service introduction time and cash flow. One way to scrutinize this could be to compare the launch of two MVNO cases – one with hosting service provider running the equipment and one with the MVNO running the equipment. From telecom equipment and service vendor viewpoint this would provide valuable information in order to tailor offering to this new customer segment.

Taking a mobile network operator viewpoint, it would be interesting to see how the capacity wholesale opening affects mobile operator's performance. In Finland the mobile network operators are quite clearly divided to two camps: Sonera is clearly against opening of the wholesale, whereas Elisa and DNA are supporters of wholesale. It would be interesting to see how the market share and performance of Sonera and DNA develops over forthcoming years as the two have very differing vision and approaches to future mobile operator market.

Coming back to the original research question, we may state that the transition in telecommunications manifests itself in two main areas in technology and in regulation, which has caused the price erosion of traditional mobile services. Consequently, operators have to seek for efficiencies and choose their area of specialization. Industry is in the verge of horizontalization and MVNO operating model would seem be the most suitable option to take care of the end-user interface in the new market circumstances, be it business-to-consumers or business-to-business.

Still, as long as MVNO ecosystem is not fully developed, MVNOs are dependent on MNO acceptance; therefore new market disruptive innovations are needed in order to access the market. In other words, MVNO has to be able to convince MNO that it has a unique value proposition that MNO cannot deliver to end-users, otherwise MVNOs will be seen as value destroying "freeriders". However, managed services and outsourcing have become increasingly popular in mobile network operator environment as well. Depending on the development of service business as well as the approval and terms of license trade in the EU parliament, it may be that mobile networks and related assets become merchandise and

mobile infrastructure vendors become network operators. Consequently, MVNO model may even become *"de facto"* operating model in the future. This may just be the remedy to take Europe back to the forerunner position in mobile services.

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